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Feasibility and Design of a Tri-Service Relational  
Database Architecture Allowing Service-Specific and  
Tri-Service Reporting

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## 1.0 INTRODUCTION

The goal of this multi-service project has been to demonstrate the feasibility of a multi-service database architecture which would allow reporting of comparable illness and injury rates among the services. Specifically, this includes identification and cross-mapping of relevant data elements, documentation and expansion of the existing Navy longitudinal database, and exploration of the feasibility of a system where separate service databases may be accessed via a common front-end for study-specific integration of data in a seamless fashion.

The growing presence of women in the military in non-traditional jobs and in combat roles raises a broad spectrum of health care issues, creating new requirements for health care research. As a result, Congress authorized a multi-service medical research program focusing on defense women's specialized health needs and directed the development of a database to support such research. The joint service database and epidemiology project represents a key element of this program. A joint service database capability and standardized research methodology are essential to cross-service research and reporting of health-related data. This final report presents first year results of this cooperative effort.

### 1.1 Background

In recent years, the percentage of women in the military and their involvement in active deployment and combat has grown. Currently women comprise approximately 14% of the total U.S. Armed Forces population and that percentage is projected to soon reach 20%.<sup>1</sup> As a result, women's health needs, including patterns of illness and injury, environmental and occupational hazards, and psychological stress, are taking on greater prominence.

In 1993 Congress authorized the Defense Women's Health Research Program (DWHRP) to epidemiologically study the health status, medical care, and occupational and environmental exposures of women in the military, and to develop a database to support this research.<sup>2</sup> In response to this mandate and in accordance with the recommendations of the Institute of Medicine (IOM),<sup>1</sup> a multi-service proposal, the Tri-Service Relational Database Project, was submitted to the U.S. Army Medical Research and Materiel Command (USAMRMC) in August of 1994 to explore the feasibility of a relational database capability that would support service-specific and cross-service reporting of incidence rates of hospitalization of active duty women. This database was to be designed and developed specifically to promote the exchange of medical information. In order to demonstrate the feasibility and utility of such an exchange, the Navy, Air Force and the Army would work cooperatively to: (1) ascertain the current research database capability of each service, (2) evolve common database objectives, (3) begin formulating a technical construct to meet those objectives, (4) standardize research methods for reporting hospitalization rates, and (5) develop an initial prototype joint-

service epidemiology study. The role of the Naval Health Research Center (NHRC) in San Diego, California, was to: (1) lay the groundwork for building a relational database capability, (2) initiate the development of standardized epidemiological methods for reporting incidence rates of first hospitalization among the three services, and (3) produce a prototype epidemiological study incorporating incidence rates from the three services.

The DWHRP database project is designed to support the informatics requirements of comprehensive epidemiologic research on a large population of women in the military in an operationally deployed situation. The Congressional Committee that established the DWHRP in 1994 commended the Department of Defense in 1995 "...for its development of a program that focuses on epidemiologic research and database development; standards and policy issues; and solutions-oriented research."<sup>2</sup> Specifically, the Committee stated that the 1995 program shall include "...epidemiologic research regarding women deployed for military operations, including research on patterns of illness and injury, environmental and occupational hazards (including exposure to toxins), side-effects of pharmaceuticals used by women so deployed, psychological stress associated with military training, deployment, combat and other traumatic incidents, and other conditions of life and human factor research regarding women so deployed."<sup>2</sup>

At the request of the USAMRMC, the IOM convened a Committee on Defense Women's Health Research and developed a report entitled "Recommendations for Research on the Health of Military Women," published in August of 1995. This report provided broad research guidelines for DWHRP research, specifying that health conditions researched be (1) unique to military women, (2) especially prevalent among military women, and/or (3) related to the ability of women to perform their mission. These guidelines have been set to ensure both military relevance and high scientific quality. The size of the current population of women in the military allows reliable gender-specific studies to be conducted.

The development of a database capability to facilitate research, a major project within DWHRP, will encompass the entire military population, incorporating career history and medical data to provide the means for reporting basic health measures such as illness and injury rates, and will serve as a resource for future epidemiologic studies. Initial steps toward this goal include enhancing existing systems; performing quality assessment, consistency edits, and relevance tests against selected existing available data sets; and building communication links between the service-specific databases. This project is interrelated with several other major efforts under the DWHRP and directly interactive with two: (1) the Women Aboard Navy Ships project and (2) the Epidemiology of Illness, Injury, and Attrition Among Select U.S. Military Training Female Populations project.

The DWHRP Tri-Service Database Project has allowed identification of women assigned to ships through review of longitudinal computerized career history files for active-duty Navy personnel. This capability was developed in collaboration with the Women Aboard Navy Ships project. Data on a particular woman assigned to serve

aboard a particular ship is linked to her corresponding demographic data through the identification of the duty station code to which she is assigned. Demographic information for ship personnel are then accessible, including age, race, pay grade, and occupational designation. This ability to link data greatly facilitates identification of study populations and matching of men serving aboard the same ship, and facilitates development of individually-specified, self-administered questionnaires aboard ships.

## 1.2 Goals: Database Development and Design of a Joint-Service Prototype Epidemiological Study

The primary goal of this project was to demonstrate the feasibility of developing a multi-service database architecture to allow reporting of comparable illness and injury rates among the services. It was acknowledged that before comparable illness and injury rates could be produced, differences in database formats, naming conventions, and coding categories would have to be resolved, and research methods to be employed in joint research endeavors would have to be standardized. This project was specifically designed to address these requirements in three broad undertakings: (1) assess the quality of the existing longitudinal database in preparation for migrating data to a relational database architecture, (2) modify and document the existing system to support feasibility studies of such a migration, and (3) design and execute a prototype multi-service epidemiological study to test the feasibility and utility of performing multi-service and service-specific analyses.

A plan was developed to allow service-specific systems to evolve to the point where a common data structure could be created and routinely used for service-specific issues and for supporting multi-service reporting of information such as hospitalization rates. This plan expanded the three broad goals of this project into seven specific objectives:

1. Develop research databases that would be geographically separated, maintained, and controlled by each service but that would adopt a common data element format to facilitate joint research.
2. Develop a multi-service common data format incorporating comprehensive medical information from a variety of data sources.
3. Refine the common format to support sharing of data in a timely manner.
4. Define all primary data sources to be included in the expansion of the existing Navy longitudinal database and the developing Air Force relational database system.
5. Identify and standardize core data elements across services, and where standardization was not practical, provide mappings of equivalent variables across services.
6. Create an infrastructure for epidemiological study design within and across services, including cohort identification and follow-up, development of sampling procedures, case identification, and data verification.

7. Develop comparative epidemiologic studies of women's health across services.

In order to achieve the seven joint-service project objectives, the Navy defined its contribution as a set of Navy-specific objectives, as follows:

1. Facilitate a series of joint workshops to explore the feasibility of developing compatible multiple service-specific relational database systems and develop standardized methods for cross-service research and reporting.
2. Fully assess data requirements, document and provide quality assurance of the existing Navy enlisted career and medical history longitudinal database.
3. Expand the existing longitudinal database to include active-duty Navy officers, Marine Corps enlisted personnel and officers, and provide database linkage with other data sources (e.g., outpatient, laboratory, shipboard, Veterans Affairs, and survey data).
4. Cross-map equivalent data elements to provide a common data element format for joint-service research, and expand cross-service communication capability.
5. Enhance user interfaces to the system.
6. Generate incidence rates of first hospitalization for selected diseases, so that compatible Army and Air Force systems could be developed.
7. Demonstrate service-specific and cooperative multi-service research activities by conducting a cooperative prototype epidemiological study of health-related events in military women.

Sections 2.0 and 3.0 describe the approach used and the work accomplished on the initial database development objectives. Sections 4.0 and 5.0 describe the methods and accomplishments related to cross-service epidemiologic research.

### **1.3 Summary of Accomplishments**

Collaboration with the Air Force on data architecture and design throughout the project resulted in the development of a plan and the completion of initial steps to build a common relational database architecture to support future joint-service research. Tri-service collaboration resulted in the standardization of epidemiological research methods and completion of a joint prototype report of hospitalization rates in active-duty enlisted women. This project transitioned to a continuing tri-service database development project under the Advisory Committee on Research Databases of Defense Women's Health Research Program. Major objectives and accomplishments are summarized in Table 1.

Table 1. Summary of Project Objectives and Accomplishments

Objectives	Accomplishments
1. Facilitate a series of joint workshops to explore the feasibility of developing compatible multiple service-specific relational database (DB) systems and develop standardized methods for cross-service research and reporting.	<p>Three workshops, with representatives from the Navy, Air Force and Army, agreed that:</p> <ul style="list-style-type: none"> <li>• The Air Force would develop a prototype relational DB with Navy support and begin cross-mapping variables.</li> <li>• The Navy would quality assure, document and expand its existing system in preparation for migration to a relational system.</li> <li>• Research methods would be standardized for joint-service reporting of hospitalization rates.</li> </ul>
2. Assess and document the existing Navy enlisted career and medical history longitudinal database; assess data requirements.	<ul style="list-style-type: none"> <li>• QA procedures were performed to validate the DB.</li> <li>• System Specifications, Data Requirements and QA documents were reviewed and expanded.</li> <li>• The Data Dictionary was augmented and verified.</li> </ul>
3. Expand the existing database to include active-duty Navy Officers, Marine Corps personnel, and for linkage with other data sources (outpatient, laboratory, shipboard, VA, survey data).	<ul style="list-style-type: none"> <li>• Active-duty Navy officers and Marine Corps enlisted personnel and officer data were added to the existing database.</li> <li>• Prototype Oracle and Sybase relational databases were developed for Navy data on a limited basis.</li> </ul>
4. Cross-map equivalent data elements to provide a common data element format for joint-service research; and expand cross-service communication capability.	<ul style="list-style-type: none"> <li>• Cross-mapping was performed using a subset of Navy and Air Force data.</li> <li>• Communication pathways were developed utilizing File Transfer Protocol (FTP) servers and software to access the internet for two-way transfer of data and text files.</li> </ul>
5. Enhance user interfaces to the system.	The PC front-end EPISYS was enhanced, program corrections made, and documentation and validation programs initiated.
6. Generate incidence rates of first hospitalization so that compatible Army and Air Force systems could be developed.	EPISYS was used to extract data and to calculate person-year based incidence rates of first hospitalization for eight diseases in Navy enlisted active-duty women.
7. Facilitate multi-service research activities by conducting a prototype epidemiological study of health-related events in military women.	<ul style="list-style-type: none"> <li>• A research paper was written employing standardized research methods to present hospitalization rates for Air Force, Army and Navy enlisted active duty women, 1990-1994.</li> <li>• This project transitioned to a continuing tri-service database development under the Advisory Committee on Research Databases of the Defense Women's Health.</li> </ul>

## 2.0 DATABASE DEVELOPMENT: APPROACH

### 2.1 Convening of Tri-Service Workshops

In order to develop a plan for meeting project objectives, the Navy hosted three workshops at which representatives of the Air Force, Army, and Navy participated. These workshops provided a venue for exchanging information about system design, data sources, data retrieval mechanisms, the feasibility of data sharing, and the specification of standardized methods for conducting joint research. The three workshops were held at the Naval Health Research Center (NHRC) in San Diego, California. Participants at these workshops identified issues, appointed ad hoc work groups, and selected standardized terms and procedures for reporting hospitalization rates across the services. Navy and Air Force computer analysts held a fourth workshop at the Defense Manpower Data Center (DMDC) in Monterey, California to define data accession procedures. (Appendix B contains a list of the participants at each workshop held in San Diego, California.)

Participants examined the feasibility and possible mechanisms for enhanced data sharing across the services, and with other organizations. It became clear during the August 1994 tri-service workshop that each service had a different level of capability for capturing information. It was therefore decided that a single, uniform database was not practical because: (1) each service has unique data elements not shared by or pertinent to the other services, (2) coding and naming conventions differ, (3) some research questions are service-specific (e.g., shipboard issues), and (4) each service needs the autonomy to manage data in a manner that is consonant with the uniqueness of its own data, its particular constellation of resources, its stage of development, its over-all data management perspective, and its particular mission.

Consequently, participants decided that service-specific databases should continue to be separately maintained. While agreeing with the goal of developing specifications for a tri-service collaborative data communications infrastructure, but recognizing that there were differences in approaches, needs, and development status between the services, the Navy and the Air Force agreed that they would work closely to jointly pursue the objectives of the DWHRP database project. The project would maximize the use of available resources, i.e., existing systems, programs, and service-specific data sources, to enhance data sharing across the services. While developing and enhancing their respective systems, the Navy and Air Force would continue to develop a common multi-service database architecture as a mechanism for extracting and pooling selected common data. This effort would involve extensive cross-mapping of equivalent variables to bridge the multiple databases and their divergent coding in accordance with existing DoD standards. Joint studies would then become feasible while preserving the service-specific conventions and overall autonomy of each service.

Collaborative arrangements were initiated to facilitate database development. It was agreed that the Navy would transfer a five-year extract of data, with their native

record and event structure intact, to the Air Force on tape. The Air Force could then use this dataset to evaluate the feasibility of constructing a relational database model for these data. Such a model could also be used by the Air Force to construct their own longitudinal research database.

The Navy planned to continue expanding the existing Navy enlisted database by adding Marine Corps enlisted personnel and officer data, and Navy officer data. The Navy and the Air Force agreed that the Air Force, with Navy input, would pursue the development of a relational database system which could serve as a prototype for the other services. ODBC (Open Database Connectivity) and SQL (Structured Query Language) are the current standards of the database applications software industry. SQL-based, ODBC-compliant database applications assure maximal flexibility in modifying data file structures and assuring compatibility with the proliferation of technologically advanced front-ends that provide quick and easy data retrieval tools to extract, analyze, graphically display, and report results. The Navy worked closely with the Air Force to begin development and testing of the Air Force's ODBC-based SQL relational system. This collaboration ensures interoperability of their respective systems.

The Navy's primary focus was to perform quality assurance on the existing Navy longitudinal database, to revise system documentation, and to expand the database. The primary focus of the Air Force was to assess the feasibility of a relational database model which could be used by any service to manage its data. Because of the separate but complementary foci of the Navy and the Air Force efforts, it was agreed that these services would leverage their respective efforts by pooling their expertise. The Navy shared their accumulated knowledge of how to acquire relevant DoD data, how to convert it to a usable format, and how to build an event-based longitudinal structure. The Air Force capitalized on this knowledge to begin development of a relational database to support medical research.

The Air Force and Navy agreed on the following activities to achieve DWHRP database project objectives: (1) The Navy would expand and the Air Force would create respective individually-based, longitudinal databases, (2) databases would have an event-based common data structure, (3) the feasibility of cross-mapping equivalent data elements would be explored, (4) databases would be designed to incorporate comprehensive demographic, career history and medical information, including hospitalizations and HIV testing, from a variety of routinely collected data sources, (5) databases would be designed to incorporate outpatient data, self-reported health surveys, stored serum sample information, access to laboratory data, tumor registry data, and other supplemental sources of clinical data, as these become available, and (6) each service would develop user-friendly interfaces for research use.

## 2.2 Assessment, Quality Assurance, and Documentation of the Existing Database

**Existing database.** The existing Navy enlisted longitudinal database was developed in 1968 to track enlisted Navy personnel career and medical history for research purposes. This is an event-based longitudinal research database which contains a record for each individual in the population and information on each career and medical event experienced by that individual. The system, written in COBOL, operates on an IBM 4381 mainframe system using a VM/CMS operating system. These individual-based records follow personnel from entry into the service through their active-duty careers, and contain a set of unchanging demographic characteristics followed by a chronological set of events, each of which is accompanied by a set of descriptors. An event may be a career change such as a promotion, the assignment of an occupation, or a change in duty station. Hospitalization data are also stored as events. A hospitalization event would include a set of descriptors such as discharge diagnoses, procedures performed, and length of stay. This event structure supports the calculation of incidence rates of hospitalization by any of the other variables available in the database.

NHRC developed a diagnostic mapping system that links the four sets of diagnostic coding systems used since 1960: (1) the DoD Disease and Injury Codes (DDIC) used by the DoD from 1960-1969, (2) ICD-8 used from 1970-1979, (3) ICD-9 used from 1980-1988, and (4) ICD-9-CM used from 1988 to the present. Each of the four successive coding schemes was converted to an expanding list of NHRC standardized codes by a team of medical specialists, expert in all relevant diagnostic areas. Verification of the NHRC mapping was accomplished by comparing frequency counts of hospitalizations using the original diagnostic codes and the NHRC codes. This cross-mapping of changing diagnostic codes into a "universal" standardized code (the NHRC codes) is unique to the Armed Forces and spans a 36-year time period. It allows researchers to pool and analyze decades of accumulated hospitalization data. (The NHRC diagnostic mapping codes are contained in sub-Appendix D of the Data Requirements Document, Appendix E.)

**Quality Assurance.** During the development phase of this project, it was determined that a review of existing data resources was a prerequisite to relational database architecture development and conversion, as well as to joint-service epidemiologic research. Data normalization, necessary for migration to a relational database system, requires verification of existing data element definitions. Validating key elements is also critical to the reliability of research findings. Existing data resources were cross-checked for identity, age, gender, duty status, loss codes, and other key variables. Quality assurance included performing a review of reference material and source data for completeness, inconsistencies, and discrepancies with Navy enlisted data. A quality assurance (QA) document was created to track the review and validation of data element values used within the existing Navy longitudinal database and to validate existing data elements and tables.

**Documentation.** Because the existing Navy longitudinal database has been built over the last 30 years, its form and content have been driven by the evolving needs of the Navy research community over time. Technical documentation of the records and field structures in the existing longitudinal database had been maintained, but additional documentation was needed for overall system operation and preparation for transitioning selected data to a relational database architecture. In addition, various documents needed to be organized into uniform data dictionaries containing data element definitions for DoD source data input files and the existing Navy longitudinal data files, as well as a listing of terms and acronyms.

The DoD Automated Information Systems (AIS) Documentation Standards (DoD-STD-7935A), October 31, 1988<sup>3</sup> and the Federal Information Processing Standards Publication - Guidelines for Documentation of Computer Programs and Automated Data Systems (FIPS-PUB-38), U.S. Department of Commerce, February 15, 1976<sup>4</sup> were selected as guidance publications to refine and expand existing documentation. After comparing existing documentation with these standards, it was determined that two additional documents were required, a System Specification (SS) and a Data Requirements Document (DRD). These two documents would also provide the Air Force with a common format to follow in the development of their longitudinal research database.

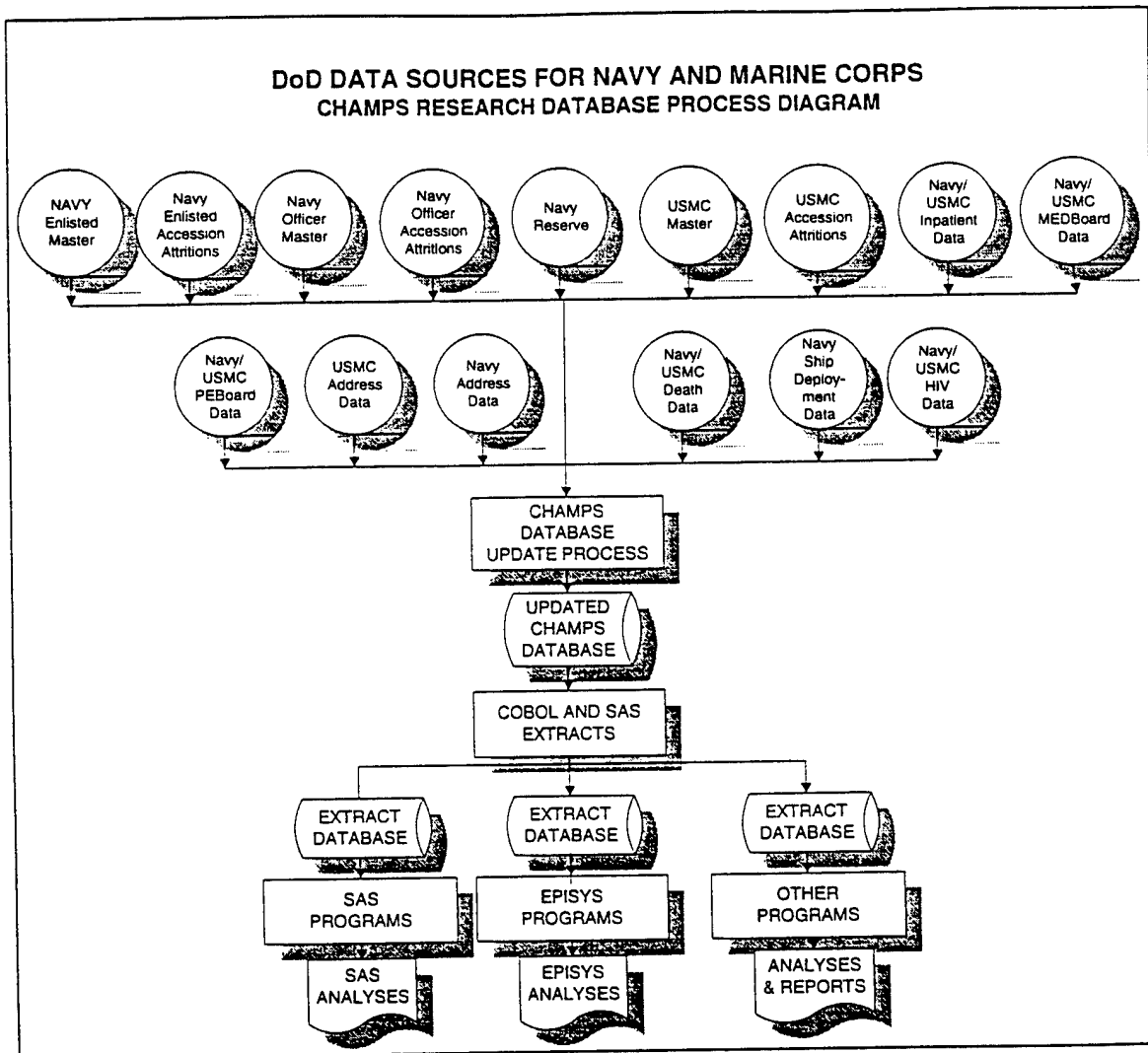
The DoD-STD-7935A standard for writing a System Specification specifies inclusion of the following components: (1) System/Subsystem Description, (2) System/Subsystem Functions, (3) AIS Equipment Environment, (4) Communications Environment, (5) Network Description, (6) Physical Interface, (7) Protocol Interface, (8) Applications User Interface, (9) Software Support Environment, (10) Software Interfaces, and (11) System Logical Flow. It was determined that a System Specification containing all of these components would be written.

The FIPS-PUB-38 recommends element descriptions, definitions, and characteristics be contained in a Data Requirements Document. To ensure validity and reliability of research results, a complete description of all available elements is required so that extracted variables and their associated values correctly represent the measures of interest. The DRD would contain a data dictionary for input file elements coming from DoD primary data sources and a data dictionary for internal Navy relevant data elements. The DRD would also describe database organization and storage allocation, and contain the data model of the logical and physical design.

### **2.3 Expansion of the Existing Database**

The existing database was expanded to include Navy officer and Marine Corps enlisted personnel and officer data, and to allow the inclusion of outpatient and laboratory test data. The expanded database was named the CHAMPS (Career History Archival Medical and Personnel System) Research Database. Figure 1 depicts the DoD source data input files incorporated into the expanded CHAMPS Research Database.

Figure 1. Data Sources for CHAMPS Research Database



#### 2.4 Data Element Cross-Mapping and Expansion of Cross-Service Communication Capability

To provide comparable data for joint research and reporting, and to aid the Air Force in patterning its event structures after the Navy model, where a subset of Air Force and Navy data elements were cross-mapped. Data element definitions were exchanged and preliminary mapping was performed to explore the feasibility of undertaking tri-service cross-mapping in the future, vital for building a joint database. Actual data files were exchanged using IBM 3480 tapes. The Air Force took the primary lead in data mapping.

A plan to expand two-way communication and for transferring small data files, tables and text files was developed utilizing File Transfer Protocol (FTP) servers and software to access the internet for exchange of encoded hospitalization data and transfer of text and spreadsheet files to support cross-service research and reporting.

## **2.5 Enhancement of User Interfaces to the System**

EPISYS (Epidemiological Projection Interactive System) is a PC-based front-end designed to rapidly access, analyze, and summarize hospitalization data. EPISYS calculates person-year based incidence rates of first hospitalization from data available in the CHAMPS Research Database, performs age-adjustment, and displays trends for all ICD-9 categories.<sup>5</sup> It was decided that EPISYS would undergo continued development as the primary interface for accessing data. Specifically, programmers would correct software code, and validate, document, and enhance the system to allow accurate reporting of hospitalization rates.

## **3.0 DATABASE DEVELOPMENT: ACCOMPLISHMENTS**

From November 1994 through December 1995, the Navy and Air Force have jointly pursued the six objectives established for this project (Section 1.2). A series of workshops were held between December 1994 and August 1995. In the August 1995 workshop, representatives of the medical research communities of the three services made presentations on the progress each service had made in implementing its respective data management approach over the previous nine months. A review of the results of the Air Force and Navy database project collaboration demonstrated that it is feasible for the two services to develop a common relational database architecture and interface. In addition, common terminology and methods for reporting hospitalization incidence rates were defined between the three services. The prototype epidemiological study included in this report represents the results of this initial collaborative demonstration.

### **3.1 Quality Assurance and Documentation of the Existing Database**

**Quality Assurance.** The existing Navy longitudinal database was examined for: (1) completeness of reference material, (2) reconciliation of demographic, medical, and service history data element references, (3) comparison of events (codes and descriptions) to the referenced event codes, (4) comparison of cross-referenced data elements to the corresponding derived variables, (5) comparison of geographic areas of accident or place of death codes to country or state code, and (6) identification of inconsistencies needing to be rectified. This information was captured in a quality assurance (QA) document used to track the ongoing review of data elements and their associated values in the Navy enlisted longitudinal database.

This QA document contains reference material used to validate and update existing tables containing coded data. Over time, as new codes are added or changed by

the source agencies from whom data is received (e.g., DMDC, BUPERS), the Navy longitudinal database electronic look-up tables that support the data input programs need to be changed accordingly. These data codes are used by editing programs to process input data and to ensure that only appropriate data are passed to the database update program. Source agency reference material specifying changes in data codes include the U. S. Marine Corps Military Occupational Specialties (MOS) Manual;<sup>6</sup> the Data Element Dictionary for the Officer Personnel Information System,<sup>7</sup> the Enlisted Master File (EMF) Data Element Dictionary,<sup>8</sup> and the Joint Uniform Pay Schedule MMS Codes Manual (JUMPS/MMSCODESMAN).<sup>9</sup> The results of this work are contained in Appendix H, the Quality Assurance Document. Appendix E includes a glossary of QA-related acronyms.

**Documentation.** Extensive documentation of the Navy enlisted longitudinal database was performed in accordance with DoD-STD-7935A<sup>3</sup> and FIPS-PUB-38,<sup>4</sup> resulting in a set of documents that include a System Specification, a Data Requirements Document, and a Data Dictionary with supplemental documentation. These documents are contained in Appendices E-G.

**Data Requirements Document.** The Data Requirements Document (DRD) was developed as part of this project and conforms to FIPS-PUB-38 standards. The DRD provides data managers, programmers and researchers with element descriptions, definitions, and characteristics, a data dictionary for input file elements coming from DoD primary data sources, and a data dictionary for internal Navy relevant data elements. Database architecture and storage requirements, and the logical and physical design of the database are also described. The DRD is contained in Appendix E.

The DRD provides technical descriptions for both static and dynamic data elements, including variable names, definitions, coding, record positions and field lengths. Formats of all input files received by NHRC from DoD sources and the format of the existing Navy enlisted longitudinal database are contained in the Appendices of the DRD. The data from DoD sources are converted to a common format to provide compatibility with existing longitudinal database formats. The data elements that comprise the Navy enlisted longitudinal database are listed in the Data Element Dictionary, which is also contained in the Appendices of the DRD. Included with each data element is a description of that element, its source, and valid values for that element. Each Navy enlisted longitudinal database element is defined, as is the system architecture and the array of DoD sources providing primary data. This effort supports system maintenance, research validity, and the eventual portability of data.

**System Specification.** The System Specification was written in compliance with DoD-STD-7935A standards and defines the processes that must be performed, their interrelationships, and their frequency of occurrence. The System Specification also contains the DoD sources of data, points of contact, data set names, and flow charts of each process. It includes technical descriptions of the system and the network; the AIS equipment, software support, and communications environments; the physical, protocol,

software and applications user interfaces; and the system logical flow. The System Specification is contained in Appendix F.

**Data Dictionary with Supplemental Documentation.** A comprehensive Data Dictionary was updated and expanded to describe all data elements existing from 1965 until the present. This includes the data element name, a full description of the element, all acceptable values for that element, element size or field length, and the field type. The history and status of all elements were annotated, i.e., when they went into effect, when they became obsolete, and if they are still current. Field descriptions were corrected (e.g., numeric, alphabetic, alpha/numeric) in the definition of data elements where applicable. These elements were defined by service (e.g., Navy or Marine Corps) and by rank (officer or enlisted). SAS labels for each data element were also included to allow statistical analysis using SAS software. A complete cross-referenced index was created for this document. The Data Dictionary is contained in Appendix G.

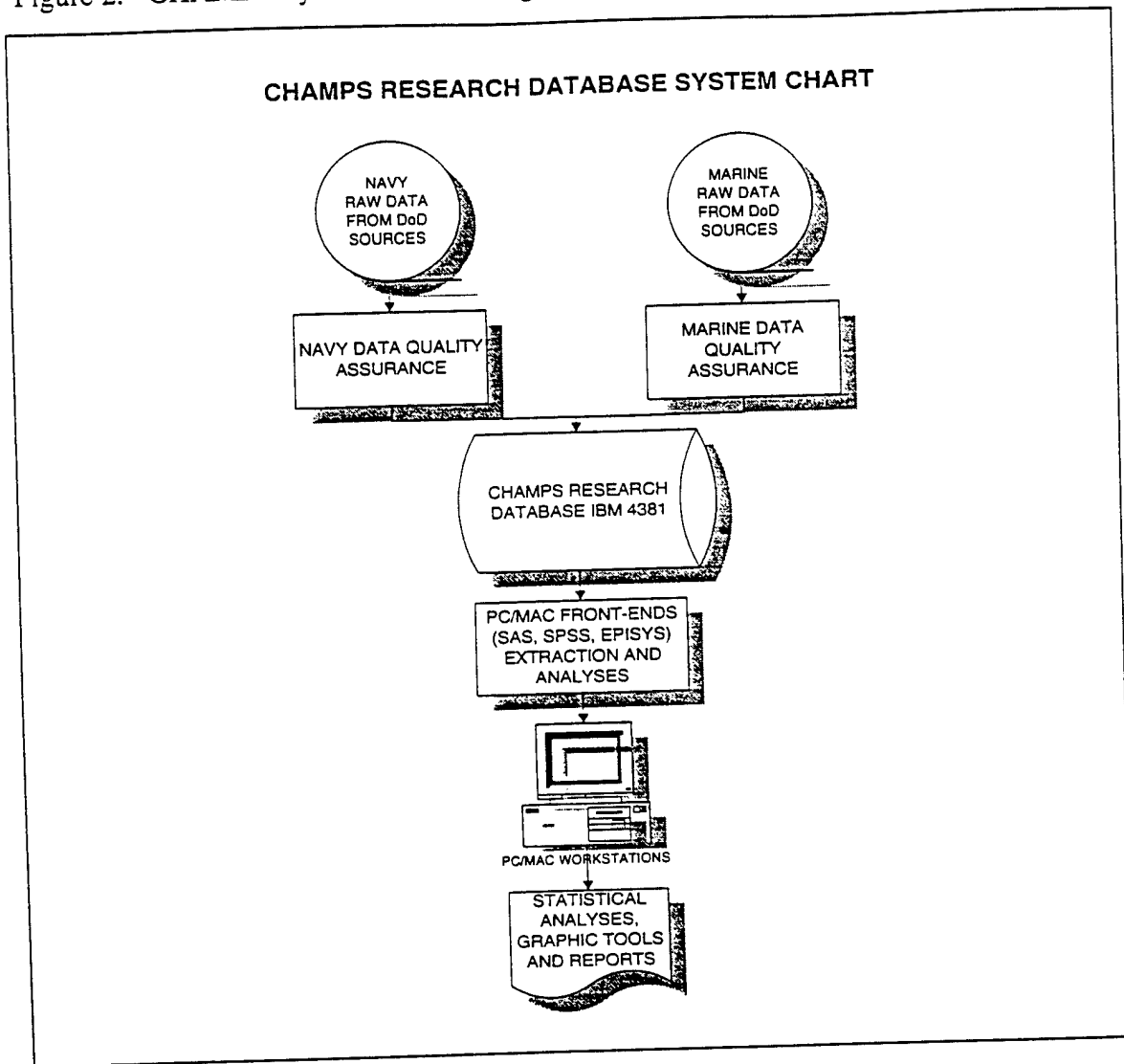
### 3.2 **Expansion of the Existing Database**

The existing database structure was modified to include Navy officer and Marine Corps enlisted personnel and officer data. New event code structures unique to these populations were designed. Raw data were obtained on tape and added to the database. The individual's name, social security number and date of birth were used to link these data records from various DoD sources. The raw data were converted to a common format to provide compatibility with existing longitudinal database formats.

The acquisition of Navy Officer and Marine Corps source data required coordination with DoD organizations. Conversion programs were written to translate the raw data into a common format required for data import and integration into the existing longitudinal database.

Upgrading the existing system into the expanded CHAMPS Research Database will allow comparisons of Navy and Marine Corps data, rate/rank comparisons, and access to a larger population of servicemen and women. Larger populations provide more reliable research results, i.e., increased statistical power for data analyses. Figure 2 displays the expanded CHAMPS Research Database system components.

Figure 2. CHAMPS System Process Diagram



### 3.3 Data Element Cross-Mapping

The Air Force needed Navy data to perform preliminary cross-mapping in order to pattern its event structures after the Navy model and to explore the feasibility of actually undertaking comprehensive tri-service cross-mapping in the future. Equivalent data elements across the services need to be cross-mapped and provided with a common standardized nomenclature for joint data reporting and for comparable service-specific data reporting. This step is vital in building a joint database.

A subset of Air Force and Navy data and corresponding definitions were exchanged. This effort attempted to identify what would be involved in comprehensive tri-service cross-mapping, including time and manpower requirements, obstacles to completion, and other feasibility issues. The Air Force received the NHRC Data

Dictionary, cross-mapped a subset of those elements that were equivalent, and identified a subset that were unique to the Navy, the Marines, or to the Air Force. Cross-mapping involved three-way mapping between Navy/Marine Corps data, Air Force data, and source data from departments such as Navy Bureau of Personnel (BUPERS), Naval Medical Information Management Center (NMIMC), Defense Manpower Data Center (DMDC), and Standard Inpatient Data Record (SIDR).

Identifying corresponding data elements and their associated values across services, with all the one to many relationships (e.g., one service using a composite value such as "other" versus the another service breaking out "other" into specific values) and many to one relationships, to be expected in databases reflecting the uniqueness of each service branch, was analytically demanding and required a high degree of precision. Equating the values of many key elements such as "occupation" proved to be a complex task. Job titles for similar occupations vary from service to service, so occupations were not easily equated without extensive review of accompanying job descriptions. Navy enlisted personnel alone are employed in over 150 occupations. Furthermore, it was agreed that a standardized set of codes to link these elements and values must be developed. This preliminary test demonstrated that cross-mapping will be very time and labor intensive.

### 3.4 DMED Relational Database Prototype

Prototype relational databases were created in Oracle and Sybase, using Navy data. One hundred thirty relevant data fields with demographic characteristics of Navy personnel, and medical events they had experienced, were identified in the Navy CHAMPS database. Data on these characteristics and events were then moved from CHAMPS to the new prototype relational databases. This allowed testing of procedures for transfer of data from a service-specific database to relational databases. The prototype databases were developed and tested on Pentium and 486 personal computers.

The prototype Oracle and Sybase databases now contain relational tables that include:

- Static demographic data,
- Dynamic demographic data, and
- Medical event data.

The static demographic data table contains unchanging information for each service member such as date of birth, gender, race, and ethnicity. The dynamic demographic table includes potentially changing data such as pay grade, duty status, primary Navy enlisted classification code, educational level, DOD loss code, and inter-service separation code. The medical event table includes diagnoses, surgical procedures performed, dates of admission and discharge, medical treatment facility, disposition, cause codes, registry number, and other medical data.

Routine technical tables also are included, such as a table that contains the last arbitrary serial identification number that was assigned by the program, which is incremented whenever an individual is added to the database. This allows automatic assignment of serial numbers to individuals.

Both Oracle and Sybase prototype databases were determined to be functional using Navy data, with each having certain advantages and disadvantages in ease-of-use and maintenance. The prototype databases that have been developed and tested have provided important information that is being incorporated into further database development.

### **3.5 Development of the EPISYS User Interface to Extract and Analyze Data**

EPISYS was used to extract and analyze Navy enlisted personnel data for the prototype epidemiology study. EPISYS is undergoing further refinement as a PC-based, user-friendly interface to the CHAMPS Research Database. It is used to calculate counts and person-year based incidence rates of first hospitalization. EPISYS contains arrays of counts of cases and population denominators, rather than entire individual records. This allows a user to rapidly obtain incidence data, perform age-adjustment, and display hospitalization trends with respect to significant Navy demographic and personnel history co-factors. EPISYS currently produces counts and hospitalization rates for Navy enlisted active-duty personnel. It is designed to run on standard IBM 486 PC equipment in a DOS/WINDOWS environment, provides menus for selection of variables, and presents tabular and graphical displays of results.<sup>5</sup> (The EPISYS User Guide and Technical Reference is contained in Appendix I.)

EPISYS was originally developed as a DOS-based program with graphics capability. Available diagnostic data was limited to the Naval Health Research Center (NHRC) 5-digit coding system, and did not include ICD-9 codes. During this project period, the following enhancements were completed: (1) all DOS-based programs were converted to Windows with full graphical user interface capability, (2) color printing capability was added, (3) codes for medical treatment facilities were added, (4) ICD-9-CM codes were added with online menu listings, with diagnostic descriptions for each code, and (5) online menu listings with diagnostic descriptions were added for all NHRC diagnostic codes. In addition, the program was tested and errors were identified and corrected. Finally, a comprehensive testing program was undertaken and is nearing completion. Full documentation and a new user's manual are planned.

## **4.0 CROSS-SERVICE RESEARCH AND REPORTING: METHODS**

### **4.1 Tri-Service Workshops: Issues and Tasks**

The three workshops held at NHRC addressed epidemiologic issues as well as database development issues. Discussions of terms, measures, and methods led to

standardization of research methods required to produce data comparability for joint research reporting. Common terminology was defined for first hospitalizations, unconfirmed diagnoses, age and gender stratification, case counts, crude and age-adjusted incidence rates, and person-years. Additional research-related issues identified by participants for future consideration are presented in Section 7.0.

#### **4.2 Development of the Epidemiology Study Prototype**

A research study was designed to investigate eight medical conditions unique or pertinent to active duty women in order to demonstrate the feasibility of conducting epidemiologic analyses across services. Two primary methods were employed to develop the prototype epidemiology study and two additional prototype report plans (presented in Appendix D): (1) the general epidemiology literature and previous Navy epidemiology studies were reviewed, and (2) a series of workshops, previously described, were convened to standardize epidemiological procedures across the services. A selection of the literature reviewed<sup>10-17</sup> is presented in Section 8.0. It was agreed by the Air Force, Army and Navy participants that incidence rates of first hospitalization for the eight diseases would be calculated for active-duty enlisted women in all the services for a five-year period, 1990-1994. Each service would use its own resources to obtain these data.

Each would search its computerized medical records of enlisted women on active duty at any time during 1990-1994 for first hospitalizations for the eight disease categories, using medical record diagnoses to identify the relevant hospitalizations. The Air Force would obtain hospitalization data from the Standard Inpatient Data Records maintained by its Medical Support Agency. The Army would obtain hospitalization data from its surveillance database, the Army Medical Surveillance System. The Navy would obtain hospitalization data from its Career History Archival Medical and Personnel System (CHAMPS) Database maintained at the Naval Health Research Center, San Diego. CHAMPS contains detailed information on service history and hospitalizations for all Navy personnel. Each service would also obtain denominator data on the number of person-years at risk, taking into account the duration of service of each woman during 1990-1994. If person-years at risk could not be calculated using existing data sources, then person-years would be estimated using end-of-year population (strength) estimates for each of the five years.

### **5.0 CROSS-SERVICE RESEARCH AND REPORTING: ACCOMPLISHMENTS**

#### **5.1 Standardized Methods for Conducting Joint Research**

Participants at the tri-service workshops reached consensus on a variety of methodological issues, including: (1) adopting standardized methods to be used at this formative stage in the collaborative process, (2) using ICD-9 standard terminology, (3) capturing medical record diagnoses, (4) counting cases, (5) calculating person-years and

confidence intervals, and (5) selecting an algorithm for age adjustment. These standardized methods, presented in Table 2, were used to conduct the prototype epidemiology study, entitled "Cooperative Prototype Tri-Service Age-Specific Study of Selected Disease Incidence in Military Women Using Inpatient Hospitalization Data," presented in Appendix C.

Table 2. Standardized Methods for Cooperative Multi-Service Research

Term/Procedure	Description	Standardized Measures
Age Adjustment	A procedure for adjusting rates, designed to minimize the effects of differences in age composition when comparing rates for different populations. <sup>18</sup>	Age adjustment is performed for cooperative studies using the indirect method of standardization (see Standardization).
Age-Adjusted Incidence Rate	The result of age adjusting: A rate that controls for the age differences between populations.	A summary rate obtained using indirect standardization to age adjust. These are the incidence rates that would be expected if the Air Force, Army and Navy all had the same age distribution.
Age Groups	Stratification into several subgroups can be used to control for the effects of confounding variables such as age. Without such a mechanism, it is possible to mistake the effect of differences in age composition for differences in disease rates, when in fact the age-specific rates are equivalent. <sup>18</sup>	Age groups are defined as follows: 17-19, 20-21, 22-24, 25-29, 30-34, 35-39, 40-44, and 45 years and above. The 17-19, 20-21, and 22-24 year-old groups represent smaller age-intervals than the older age groups. This was done because of the large number of young personnel in the military.
Case	Individuals identified as having the particular disease, health disorder, or condition under investigation. <sup>18</sup>	<p>The number of first hospitalizations for each diagnosis for all individuals observed during the study period.</p> <p>For this study, services are reporting cases of their own personnel admitted to their own hospitals and not to other service hospitals. For future studies, each service will exchange hospitalization data for those persons admitted to their service-specific hospitals who are members of the other services.</p>
Confidence Interval (95%)	Since the sample may not be representative of the larger population if the data were complete, or of a longer time period of observation, a statistical estimation is made to determine the range or interval of values that has a 95% probability of including the true incidence rate. The interval is bounded by an upper and lower confidence limit. <sup>18, 19</sup>	Confidence limits around the incidence rates are based on the Poisson distribution. <sup>18</sup>

Table 2. Standardized Methods for Cooperative Multi-Service Research (continued)

Term/Procedure	Description	Standardized Measures
Crude Incidence Rate	<p>A measure of the frequency with which a particular event occurs in a defined population. All rates are ratios, calculated by dividing a numerator, (e.g., the number of hospitalizations for kidney disease), by a denominator, (e.g., the total population at risk of contracting kidney disease for a specified time period).</p> <p>The population denominator can be expressed as the total number of people at risk or as person-time units (e.g., person-years) at risk.<sup>18,19</sup></p>	The number of first hospitalizations per 100,000 person-years at risk, without adjusting for age.
Denominator	The lower portion of a fraction, (e.g., the population at risk), used to calculate a rate. The denominator can be expressed as the average population at risk during a specified period, or as person-time units at risk for that period. <sup>18</sup> (see Person-years)	Denominator (population) data are expressed in person-years at risk.
Diagnosis	The identity of the condition from which a patient suffers. <sup>18</sup>	The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) was used to classify diagnoses. <sup>20</sup> The Army stores data on a maximum of eight discharge diagnoses (primary, secondary, etc.), the Navy 10, and the Air Force 20. The Army searches eight deep to identify diagnoses of interest, the Navy searches 10 deep, and the Air Force searches the first 10 of its 20 hierarchical discharge diagnoses.
First Hospitalization	The first inpatient admission within the specified interval for a unique ICD-9 diagnosis. Second and later hospitalizations for the same diagnosis are excluded in order to provide unduplicated counts.	For this study, only the first hospitalizations for the full five-year interval were used. For future studies, subsequent hospitalizations may be included based on criteria appropriate for certain diagnoses.
Numerator	The upper portion of a fraction used to calculate a rate. <sup>18</sup> The number of cases or occurrences of first hospitalizations. <sup>21</sup>	Occurrences of first hospitalizations.

Table 2. Standardized Methods for Cooperative Multi-Service Research (continued)

Term/Procedure	Description	Standardized Measures
Person-Years at Risk	A method for calculating rates when the population is not constant and people enter or with draw at different points during the period of observation. It is the sum of the individual years that persons in the study population have been at risk of contracting the condition of interest. Each person contributes only as many years as he/she is actually observed in the time interval of interest, i.e., 100 person-years may represent 100 persons for one year, one person for 100 years or any intermediate mixture between these extremes. <sup>22</sup>	This denominator combining persons and time is the sum of the number of days each person at risk contributed during the observation period, divided by 365¼.
Standardization	<p>A set of techniques used to remove as far as possible the effects of differences in age, gender or other confounding factors, when comparing two or more populations.<sup>18</sup> For purposes of this study, "standardization" is synonymous with age-adjustment.</p> <p>Two methods of standardization can be used, direct or indirect. The most frequently adopted method is the indirect method. It is used to compare study populations when some age groups have small sample sizes producing specific rates that may be too imprecise and unreliable, i.e., statistically unstable, for use in detailed comparisons.<sup>18,23,24</sup></p>	<p>Since the population under study may be statistically unstable, indirect standardization as a method of age adjusting is used.</p> <p>Indirect standardization involves a series of mathematical steps as described by Lilienfeld<sup>19</sup> and Chan et al.<sup>24</sup> The specific rates in the standard population are averaged, using as weights the distribution of the study population. The ratio of the crude rate for the study population to the weighted average obtained is the standardized incidence ratio or SIR. The indirect standardized rate is the product of the SIR and the crude rate of the standard population (Note: a SIR is the incidence equivalent of a Standardized Mortality Ratio or SMR; see Lilienfeld<sup>19</sup> and Chan et al<sup>24</sup> for an explanation of SMR's).</p>
Standard Population	A commonly available population of known age distribution. <sup>18</sup>	For this report the sum of the person-years for Air Force, Army, and Navy enlisted women between 1990-1994 was used. For future studies, a total force standard population for an as yet to be determined time interval will be selected.

## **5.2 Joint Research Study Results**

The first phase of this research project focused on the acquisition and presentation of first hospitalization rates by disease in active duty women. First hospitalization rates can serve as indicators of disease incidence. The capability to obtain multi-service incidence rates allows comparative studies by gender and branch of service, and comparisons with civilian hospitalization rates. The relationship of disease and injury incidence to other military-relevant variables such as occupation, pay grade, and duty station assignment also can be analyzed. Researchers can then begin to characterize the nature, extent, causal factors, and distribution of diseases in active duty women, and design interventions to prevent and control these diseases.

The interim standardized methods for conducting this joint research study will serve as the basis for future development of long-term joint research standards. The data produced for this prototype study are preliminary, incomplete in some cases, and are not suitable for drawing inferences. However, they present a prototype preliminary analysis of incidence rates of first hospitalization for each service. After the services have gained more collective experience refining these research standards and procedures, the focus can appropriately shift to the actual research outcomes, statistical inferences, and the implications for policy, prevention, and treatment of service women.

This study confirmed the feasibility and utility of conducting cooperative multi-service research studies on women's health issues, in addition to providing the impetus for standardizing research methods and defining common terminology (See Appendix C). Issues of data completeness and the need to develop procedures to obtain missing data were addressed. It was agreed that confounding and artifactual factors (e.g., differences in policies and practices between the services) that could contribute to differences among services in first hospitalization rates will need to be further identified and explored.

## **6.0 CONCLUSIONS**

The year one efforts demonstrated the feasibility of a multi-service database architecture that would allow reporting of comparable illness and injury rates among the services. Specifically, this included identification and matching of relevant cross-service data elements to produce a prototype report of incidence rates of first hospitalizations, documentation and expansion of the existing Navy longitudinal database, and exploration of the feasibility of a system where separate service databases might be accessed via a common front-end for study-specific integration of data.

The first phase of this project has focused on cross-service sharing of expertise and experience in epidemiological research and in the database development required to support such research. Products from this collaboration included (1) complete documentation of career and medical history primary data sources, (2) establishing that a common database architecture is feasible for capturing, maintaining, extracting, and

analyzing these sources of data, (3) preliminary cross-mapping of multi-service data to identify the feasibility issues involved in ultimately cross-mapping all database elements and adopting a common set of standardized elements and nomenclature, (4) development of mechanisms to exchange hospitalization data for cross-service research, (5) development of standardized methods and terminology for conducting research and presenting findings, and (6) a joint-service demonstration study presenting Air Force, Army, and Navy incidence rates of first hospitalization for eight disorders pertinent to military women using comparable rate calculations, statistical adjustment, and reporting format.

A 13-month collaboration of the Navy, Air Force and Army medical research community was begun, and has culminated in the development of a prototype epidemiology study that presents tri-service hospitalization rates for service women. To produce this report, the Air Force, Army, and Navy medical research communities conducted workshops to begin the process of identifying research issues, assigning work-group tasks and defining common conventions and procedures to standardize data reporting. Workshop participants determined that each service would maintain a separate, geographically dispersed data management system. However, the recent development of common terminology for research variables and standardized epidemiological methods now allow multi-service reporting of first hospitalization data. Common definitions and standards can be applied to outpatient, tumor registry, HIV testing, stored serum sample data, and health survey results for expanded epidemiological research.

The Navy enhanced substantially the documentation for an existing system and modified the enlisted longitudinal database to include Navy officer, Marine Corps enlisted, and Marine Corps officer data. It began drafting plans for a partial retrofit of a data subset to an Open Database Connectivity (ODBC) compliant relational database. This data subset, identified as multi-service "common" data to be used in the next joint epidemiology study, could then potentially be pooled with equivalent Air Force and Army data subsets for future longitudinal research projects. The Air Force has begun developing a relational model suitable for storing research data and a user interface that could be used by all services to access multiple databases.

Accomplishments in standardization, data exchange, the preparation of existing systems for migration to a common database architecture, and the acquisition of data from multiple DoD sources will facilitate future multi-service research endeavors and joint reporting of results. These multiple data sources now include Navy enlisted, Navy officer, Marine Corps enlisted, and Marine Corps officer data, all linked to produce data files that can readily be integrated. The prototype epidemiological study included in this report represents the current culmination of these efforts.

## 7.0 RECOMMENDATIONS FOR CONTINUED DATABASE AND JOINT-SERVICE EPIDEMIOLOGIC RESEARCH DEVELOPMENT

### 7.1 Database Development

**Partial Data Conversion to a Relational Database.** A set of data elements common to all services that could be included in the next epidemiologic research study needs to be identified. This joint-service "common" data will form the core of future relational database architecture development. This data subset would be extracted from the CHAMPS Research Database and transferred to a pilot relational database system in preparation for future data migration. Such an effort would constitute a partial retrofit, i.e., a minimal standard dataset from the existing data migrated to a new platform.

**Tri-Service Cross-Mapping of Data Elements.** Cross-mapping of equivalent data elements is required to provide comparable data for inclusion in a multi-service database designed to pool research relevant data for joint research and reporting. The cross-mapping will include three-way mapping of equivalent service-specific data elements among services, and with source data elements from such departments such as the Navy Bureau of Personnel (BUPERS), the Naval Medical Information Management Center (NMIMC), and the Defense Manpower Data Center (DMDC). A feasibility study undertaken by the Air Force in cooperation with the Navy demonstrated that this effort is likely to be very time-consuming and will require significant resources for completion. A useful first step would be to cross-map the dataset identified as tri-service common or shared data to be used in piloting a joint relational database architecture.

### 7.2 Joint-Service Research

**Data Completeness.** Data completeness issues were discussed at the final workshop. It was agreed that the services should develop a strategy to provide each other with hospitalization data for personnel admitted to medical treatment facilities (MTF's) of other services. Participants agreed that hospitalizations have been historically under-reported by the respective services because data were not available on individuals treated at each other's service facilities. Sharing these data would provide more complete reporting of incidence data for all future cooperative research studies and would represent a significant advance for DoD reporting of diseases and injuries across all the services. A multi-service work group should be identified to define the process of capturing and exchanging this data.

**Standardization of Methods.** Development of standardized methods for conducting epidemiologic studies needs to be continued. A multi-service work group should be identified to continue the process of jointly defining the epidemiological and biostatistical methods that will provide the basis for future collaborative research projects.

**Rate Comparability.** Differences between the services in hospitalization-related policies and procedures, as well as differences in data capture and reporting practices may

be contributing to the differences in hospitalization rates by service. In addition, several potential confounders may be artifactually increasing (or decreasing) rate disparities. To increase cross-service comparability these factors will need to be identified further and strategies developed to control for their effects.

Expanded Analyses. Additional research is needed to control for the effects of confounding factors and to study the impact of additional military-relevant variables. Other variables to be considered include race, occupation, work exposures, duty station, and length of service.

## **8.0 PERSONNEL LISTING**

Listing of all personnel receiving pay from the contract support:

### NHRC Personnel

Frank C. Garland, Ph.D.

Milan R. Miller

William M. Pugh, M.S.

E.K. Eric Gunderson, Ph.D.

### Contract: GSA

Ronald E. Clapsaddle, B.S.

Paul A. Pehau

Wendell M. Fretty

Ivan T. Show, Ph.D.

Paul Robertson, Ph.D.

Karen M. Freeman, M.P.H

Seth A. Frack, M.P.H

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## **APPENDIX A**

### **CONGRESSIONAL ACTIONS**

CONGRESSIONAL ACTIONS ON FY 1994 BUDGET  
TABLE 1

PRESIDENT'S BUDGET	HASC Report 103-200, 7/30/93	SASC	HAC Report 103-254, 9/22/93	SAC Report 103-153, 10/04/93	JOINT AUTHORIZATION Report 103-357, 11/10/93	JOINT APPROPRIA- TION
No request	+20M	None	+20M	None	+20M	+20M - special Interest
	<p>Page 181 - Committee is concerned with the dearth of medical research and study of the unique medical problems related to female members of the armed forces as well as other women eligible for medical services from the department...</p> <p>...recognizes that women in the military continue to face a host of health issues, related to combat and other in-line-of-duty situations, including stress, exposure to toxins, reproductive health, menopause, mental health and sexual violence.</p> <p>Many issues are of unique concern to women in the military, but have been overlooked by the military medical research and service provider community.</p> <p>The expanding population of women in the military offers a distinctive and reliable number of potential subjects for long-term, gender-specific research studies. Studying this cohort and monitoring the military medical care system for gender-specific issues will provide the military with valuable clinical data for both military and civilian women.</p> <p>To address this problem... recommends the establishment of a Defense Women's Health Research Center.</p> <p>These provisions would further require that clinical medical research conducted or supported by the department shall include women and members of minority groups, and that data collected by such research be coded to allow for analysis of gender or racial differences among subjects.</p>	None	<p>Page 192 - The Committee has recommended \$40,000,000 only to be used for research on women's health issues related to service in the armed forces.</p>	<p>Page 375 - The Committee directs the Department to provide a report evaluating the provision of preventive and primary health care services through military medical treatment facilities and the Civilian Health and Medical Program of the uniformed services to female members of the uniformed services and female covered beneficiaries eligible for health care under chapter 55 of title 10, United States Code. This report shall include a description of the demographics of the population, the leading categories of morbidity and mortality, a description of the numbers and types of health care providers employed in providing health care, and descriptions of programs the Department has in place or plans to implement to assess the health needs of women.</p>	<p>Page 612 - The conferees agree that the Secretary of Defense may establish a women's health research center at an existing DoD medical center ...</p> <p>The conference agreement would authorize an additional \$20.0 million of fiscal year 1994 defense research funds in PB 63002A for establishment of the center or for medical research relating to women's services in the military at existing DoD medical centers, should the Secretary choose not to establish the center.</p> <p>The conferees agree that the purpose of this funding is to provide a coordinated effort for medical research within DoD on women's health issues in relation to women's service in the military. The Department of Defense must spend this funding for that purpose under a single coordinating agent within DoD.</p> <p>Statutory Requirements are on Page 63.</p>	<p>Page 110 - DD Form 1414 for fiscal year 1994 shall show the items marked with an asterisk ("*") as Congressional interest items, a change to which requires prior approval.</p>

Table 1 - Page 1

CONGRESSIONAL ACTIONS ON FY 1995 BUDGET  
TABLE 2

PRESIDENT'S BUDGET	IIASC Report 103-449, 5/10/94	SASC Report 103-282, 6/14/94	IIAC Report 103-562, 6/27/94	SAC Report 103-321, 7/29/94	JOINT AUTHORIZATION Report 103-701, 8/12/94	JOINT APPROPRI- ATION Report 103-747, 9/26/94
No Request	<p>+ \$40M</p> <p>Page 145 - At a time of women's growing presence and new role in the military, the committee is concerned with the dearth of medical research and study of the unique medical problems relating to female members of the armed forces and other women eligible for medical services from the Department.</p> <p>The Department of Defense has established a military service research program with the Army acting as the executive agency for implementation of this research. The committee commends the Department and the ... (USAMRDALC) for its development of a strong program that focuses on: epidemiological research and data base development; policies and standards issues; and solutions-oriented research. The committee applauds the Department and the Army for its rapid development of a program that minimizes overhead costs and will, if sustained, add significantly to the quality of life of women service members, add to the readiness of the forces, and add to women's medical care.</p> <p>This section would authorize \$40.0 million in PE 603002A to continue this program.</p>	<p>+ \$40M to PE 63002D</p> <p>Page 104 - The committee supports the decision ... to carry out medical research relating to the service of women in the military in a decentralized fashion rather than through... a center....supports the proposed military service research program on women's health with the Army ...as the executive agency. ... recommends a provision that would provide a statutory charter for the program...adds \$40.0 million to PE 63002D to continue the program...clear to the committee that the increasing participation of women in the military...created new requirements for medical research. These requirements span the military services and are insufficiently addressed by the much larger medical research programs of the Department of Health and Human Services (HHS), which focus on the general health care needs of the American population.</p> <p>Requirements include research on combat stress and trauma, on exposure to toxins and environmental and occupational hazards associated with military service, and on patterns of illness in military service women.</p>	<p>+40.0M</p> <p>Page 273 - The Committee has included \$40,000,000 for the Defense Women's Health Program. The Committee notes that Magee-Women's Hospital in Pittsburgh is a national leader in addressing women's health problems and encourages the Department of the Army to work with the hospital as it develops and implements this program.</p>	<p>+40M</p> <p>Page 238 - ...the Committee approves \$40,000,000 to continue the Defense Women's Health Program.</p> <p>Page 355 - The Committee directs that a portion of the funding for the Defense Women's Health Program be used for a comprehensive preventive research program on Paget's disease, osteoporosis, osteogenesis imperfecta, and related bone diseases.</p>	<p>+40M</p> <p>Page 41 - (Note: Statutory basis for program continuation)</p> <p>Sec. 241. Defense Women's Health Research Program.</p> <p>(a) ...The program shall continue to serve as the coordinating agent for multi-disciplinary and multi-institutional research within the Department of Defense on women's health issues related to service in the Armed Forces. The program shall continue to coordinate with research supported by other Federal agencies that is aimed at improving the health of women.</p> <p>(b)... The Departments of the Army, Navy and Air Force shall each participate in the activities under the program.</p> <p>(c)...The Secretary of Defense shall designate the Secretary of the Army to be the executive agent for administering the program.</p>	<p>+40M</p> <p>No language</p>

Table 2 - Page 1

TABLE 2 CONTINUED

PRESIDENT'S BUDGET	IIASC Report 103-449, 5/10/94	SASC Report 103-282, 6/14/94	IIAC Report 103- 562, 6/27/94	SAC Report 103-321, 7/29/94	JOINT AUTHORIZATION Report 103-701, 8/12/94	JOINT APPROPRI- ATION
		<p>The key to the defense women's health program, as it is for the rest of the DoD medical research program, is to focus limited DoD resources on the specialized needs of service members related to their military service and to leverage, not duplicate, the \$11.5 billion annual research program of the National Institutes of Health and the \$2.0 billion annual investment of the Centers for Disease Control and Prevention.</p> <p>The Committee is especially concerned, for example, that DOD conduct adequate research into the possible mental and physical threats that women may face if they become prisoners of war.</p>		<p>Page 355 - The Committee urges the Defense Women's Health Program to work closely with the National Institute of Arthritis, the lead Institute on bone diseases.</p> <p>Page 356 - The Committee instructs the Department of Defense to ensure that the Women's Health Research Program support at least two research centers within schools of social work in communities with large concentrations of military families (including the University of Hawaii). The centers would conduct research on the impact on the health functioning of women in the military of psychosocial factors resulting from family violence, military deployment, and downsizing, with special attention to research on intervention strategies undertaken by social workers as primary providers of health care to military families.</p>	<p>Sec 241 (continued)</p> <p>(d) ... If the Secretary of Defense intends to change the plan for the implementation of the program previously submitted to the Committees on Armed Services of the Senate and House of Representatives, the amended plan shall be submitted to such committees before implementation.</p> <p>(e) ... The program shall include the following activities regarding health risks and health care for women in the Armed Forces: (1) The coordination and support activities described in section 251 of Public Law 103-160. (2) Epidemiologic research regarding women deployed for military operations, including research on patterns of illness and injury, environmental and occupational hazards (including exposure to toxins), side-effects of pharmaceuticals used by women so deployed, psychological stress associated with military training, deployment, combat and other traumatic incidents, and other conditions of life, and human factor research regarding women so deployed. (3) Development of a data base to facilitate long-term research studies on issues related to the health of women in military service, and continued development and support of a woman's health information clearinghouse to serve as an information resource for clinical, research, and policy issues affecting women in the Armed Forces. (4) Research on policies and standards issues, including research supporting the development of military standards relating to training, operations, deployment, and retention and the relationship between such activities and factors affecting women's health. (5) Research on interventions having a potential for addressing conditions of military service that adversely affect the health of women in the Armed Forces.</p> <p>(f) ... Of the amount authorized to be appropriated pursuant to section 201, \$40,000,000 shall be available for the Defense Women's Health Research Program referred to in subsection (e).</p>	

Table 2 - Page 2

## **APPENDIX B**

### **JOINT SERVICE WORKSHOPS**

## **TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP #1**

**December 13 & 14, 1994  
San Diego, CA**

**Attendees:**

Bruce Coate, Statistician  
Naval Health Research Center  
John Cornali, Lieutenant Colonel, United States Air Force  
Office for Prevention and Health Services Assessment,  
Brooks Air Force Base  
Edward D. Gorham, M.P.H., Research Epidemiologist  
Naval Health Research Center  
E.K. Eric Gunderson, Ph.D., Senior Scientific Advisor  
Department of Health Sciences and Epidemiology,  
Naval Health Research Center  
Gus Gustafson, Computer Scientist  
Consultant – General Services Administration  
Milan R. Miller, Computer Programmer/Analyst  
Department of Health Sciences and Epidemiology  
Naval Health Research Center  
John W. Overland, Computer Programmer/Analyst  
Consultant – Ogden Government Services  
Paul A. Pehau, Senior Programmer/Analyst  
Consultant – Ogden Government Services  
William M. Pugh, Department Head, Medical Information Systems  
and Operations Research, Naval Health Research Center  
Kathleen A. Scott, Project Leader  
Office for Prevention and Health Services Assessment,  
Brooks Air Force Base

**TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP #2**

**April 4, 1995  
San Diego, CA**

**Attendees:**

Ronald E. Clapsaddle, Senior Computer Programmer/Analyst  
Ogden Government Services

Mona M. Everett, Ph.D., Systems Analyst/Programmer  
Office for Prevention and Health Services Assessment  
Brooks Air Force Base

Frank C. Garland, Ph.D., Department Head  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

Betty J. Gunderson, M.A., Administrative Coordinator  
Uniband, Inc.

E.K. Eric Gunderson, Ph.D., Senior Scientific Advisor  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

James A. Kiesling, Department Head  
Clinical Data Management and Analysis Department  
Navy Aero Medical Institute

Lynn I. Levin, Ph.D., Research Epidemiologist  
Division of Preventive Medicine  
Walter Reed Army Institute of Research

Milan R. Miller, Computer Programmer/Analyst  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

John W. Overland, Computer Programmer/Analyst  
Consultant – Ogden Government Services

Paul A. Pehau, Senior Programmer/Analyst  
Consultant – Ogden Government Services

Jamie K. Pugh, M.S., Statistician  
Research, Development, Test, and Evaluation Division  
Naval Command Control and Ocean Surveillance Center

Kathleen A. Scott, Project Leader  
Office for Prevention and Health Services Assessment  
Brooks Air Force Base

Ivan T. Show, Ph.D., Systems Analyst/Programmer  
Southwest Research Associates

Martin R. White, M.P.H., Research Epidemiologist  
Operations Research Department,  
Naval Health Research Center

**TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP #3**

**August 10 & 11, 1995  
San Diego, CA**

**Attendees:**

Roger Anderson  
Office for Prevention and Health Sciences Assessment (OPHSA)  
Brooks Air Force Base

Ronald E. Clapsaddle  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

Mona M. Everett, Ph.D.  
Office for Prevention and Health Sciences Assessment (OPHSA)  
Brooks Air Force Base

Seth Frack  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

Karen Freeman  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

Frank C. Garland, Ph.D., Department Head  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

Edward D. Gorham, M.P.H., Research Epidemiologist  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

E.K. Eric Gunderson, Ph.D., Senior Scientific Advisor  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

James A. Kiesling, Department Head  
Clinical Data Management and Analysis Department  
Naval Aerospace Medical Institute

Lynn I. Levin, Ph.D., Research Epidemiologist  
Division of Preventive Medicine  
Walter Reed Army Institute of Research

John G. Meyer, Lieutenant Colonel, Medical Corps, United States Air Force  
Executive Manager, Office for Prevention and Health Sciences  
Assessment (OPHSA)  
Brooks Air Force Base

Milan R. Miller, Computer Programmer/Analyst  
Department of Health Sciences and Epidemiology  
Naval Health Research Center

William M. Pugh, Department Head  
Medical Information Systems and Operations Research  
Naval Health Research Center  
Mark Rubertone, Major, Medical Corps, United States Army  
Division of Preventive Medicine  
Walter Reed Army Institute of Research  
Kathleen A. Scott, Project Leader  
Office for Prevention and Health Sciences Assessment (OPHSA)  
Brooks Air Force Base  
Jonathan S. Stapley, Lieutenant Colonel, Medical Corps, United States Air Force  
Chief, Information Analysis and Studies Division  
Office for Prevention and Health Sciences Assessment (OPHSA)  
Brooks Air Force Base

## **APPENDIX C**

### **JOINT SERVICE PROTOTYPE EPIDEMIOLOGY STUDY**

### **Abstract**

Congress has mandated research on women's health in the Department of Defense. This study uses standardized methods to assess and compare disease incidence in active-duty enlisted Air Force, Army, and Navy women, using data on first hospitalizations. Eight diagnostic categories relevant to the health of military women were analyzed. Computerized records of the enlisted women on active duty in the three services during a five-year period from January 1, 1990 to December 31, 1994, were searched for first hospitalizations. This prototype study presents multi-service standardized epidemiologic methods and preliminary service-specific, age-specific, and age-adjusted data.

### **Cooperative Prototype Tri-Service Age-Specific Study of Selected Disease Incidence in Military Women Using Inpatient Hospitalization Data**

Congress has mandated a medical research program to focus on the specialized health needs of military women, including patterns of illness and injury, environmental and occupational hazards, and psychological stress, as well as the development of a database to facilitate long-term research studies (1). The number of women in the military is growing: women comprise 14 percent of the Armed Forces population in the United States, and the percentage is projected to rise to 20 percent (2). The expanding population of women in the military offers distinctive opportunities for long-term gender-specific studies. It can also provide valuable data pertinent to civilian as well as military women (1). Comprehensive incidence rates from such studies would be useful in planning preventive strategies, and in providing adequate and appropriately trained treatment personnel and health care facilities for women.

Epidemiologic studies in the military have historically been limited to service-specific data resources, and no previous study was identified that used joint multi-service data to assess incidence rates of first hospitalizations for any disorder. Furthermore, no multi-service investigation was identified that focused exclusively on women. Although several studies have examined gender differences in hospitalization or sick call visit rates, they have been confined to a particular service. In one study, pregnancy-related conditions—primarily delivery of newborns—were determined to be the leading reason for hospital admissions (34 percent) in women in military service (3). A Navy study Nice and Hilton analyzed sick call visit rates aboard ships according to gender and other characteristics, providing useful and suggestive data on gender differences in disease occurrence in operational settings (4, 5). These important studies have provided a context for health research on military women, but further studies are needed. Among diseases needing further investigation are health conditions that occur exclusively in women, such as pelvic inflammatory disease and endometriosis, and those that occur in both sexes, but disproportionately affect women, such as kidney infections (4-8), systemic lupus erythematosus (8), and genitourinary disorders (4-8).

An objective of the present study was to provide standardized methods for calculating epidemiologic measures that could serve as an example for future multi-service women's health research. First hospitalization rates were used as an example of a measure of disease incidence

that is particularly useful for measuring the most serious forms of the diseases studied, namely cases requiring hospitalization. Eight disease categories were selected for investigation. The diseases selected were either unique to—or more common in—women, possibly amenable to preventive intervention during military service, of known interest to the women's health research community, and having a spectrum of severity broad enough to include serious cases requiring hospitalization.

### **Methods**

The time interval of interest was the five-year period from January 1, 1990 to December 31, 1994. Each service used its own resources to ascertain hospitalization data on the diagnoses of interest, and population data on the number of person-years in active-duty enlisted women, according to age.

#### Hospitalization data

Computerized medical records of Air Force, Army, and Navy enlisted women on active duty at any time during 1990-1994 were searched for hospital discharge diagnoses. The Air Force obtained hospitalization data from the Standard Inpatient Data Record maintained by the Air Force Medical Support Agency (9). The Army obtained hospitalization data from its existing surveillance database, the Army Medical Surveillance System. The Navy obtained hospitalization data from its Career History Archival Medical and Personnel System (CHAMPS) Database, a comprehensive career history database maintained at the Naval Health Research Center, San Diego, that contains detailed information on service history and hospitalizations for all Navy personnel (10-14).

#### Population data

Air Force, Army, and Navy enlisted women on active duty at any time during 1990-1994 were the three service-specific populations used in this study. The Air Force obtained population data from the Uniform Airmen and Uniform Officer records maintained by the Armstrong Laboratory Human Resources Directorate. The Army obtained population data from the Army Medical Surveillance System. Population data for the Navy obtained were from the CHAMPS Career History Database (10).

Two types of population data were obtained: the Army and Navy used the actual beginning and ending dates of service for each active-duty individual to calculate person-years at risk, while the Air Force used end-of-year annual population (strength) data to estimate person-years at risk. The total number of person-years at risk in active-duty enlisted women during 1990-1994 for the Air Force was estimated at 280,001, for the Army it was 308,797, and for the Navy it was 217,873.

### Statistical Procedures and Diagnoses

The Navy and Army calculated incidence rates of first hospitalization by dividing the number of first hospitalizations during the period of observation by the number of person-days at risk, divided this value by 365.25 to convert from rate in person-days to rate in person-years, then multiplied the result by 100,000 to provide rates expressed per 100,000 person-years at risk (15). The Air Force used a similar approach, with person-years at risk estimated directly from average annual end-of-year population data. Populations were stratified by age and age-specific rates were calculated for these age groups: 17-19, 20-21, 22-24, 25-29, 30-34, 40-44, and 45 years and older. Ninety-five percent confidence intervals were constructed around each age-specific rate using a standard method based on the Poisson distribution (16).

Nearly all comparisons of rates among populations require statistical adjustment for differences in the age distributions of the populations (15). Methods for assessing the statistical significance of observed differences in military populations have been described (10). Although various alternative procedures were evaluated, indirect standardization was used in this investigation to adjust rates for differences in the age distributions of the three service populations. The indirect method is appropriate even when some age strata contain small numbers and the associated age-specific rates are not adequately precise for direct standardization (17).

The diagnoses studied, with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9) (18) codes shown in parentheses, included two common behavioral disorders in military women, adjustment reactions (ICD-9 309) and personality disorders (ICD-9 301), and five physical illness categories affecting many military women: kidney infections (ICD-9 590), endometriosis (ICD-9 617), pelvic inflammatory disease (ICD-9 614), cholelithiasis (ICD-9 574), and cholecystitis (ICD-9 575.0-575.1). In order to provide a more precise assessment of a common form of depression in military women, adjustment reactions were further divided for analysis into depressive type reactions (ICD-9 309.0-309.1) and all other and unspecified

adjustment reactions (ICD-9 309.2-309.9).

## Results

Age-adjusted incidence rates varied among the three Services according to diagnosis. Age-specific rates for women in all services (Air Force, Army, Navy) are shown in Tables 1-8. These results are preliminary, and represent data that may be incomplete.

Age-adjusted incidence rates of first hospitalization for depressive type adjustment reactions ranged from a low of 195 per 100,000 person-years (95% confidence interval (CI), 178-213) in the Air Force to a high of 416 (95% CI, 391-443) in the Army (Table 1). Air Force and Navy rates were lower than Army rates in all age groups. Rates decreased steadily in Army and Air Force women until age 35-39 years, when they reached a plateau or increased slightly.

Age-adjusted incidence rates of first hospitalization for all other and unspecified adjustment disorders ranged from a low of 305 per 100,000 person-years (95% CI, 283-329) in the Navy to a high of 569 (95% CI, 535-606) in the Army (Table 2). The highest age-specific rate was in Army women aged 17-19 years, who had a rate of 1,547 per 100,000 person-years. Rates in all three services decreased steadily until age 40-44 years, when the rates for all services increased, and then decreased again at 45 years and older.

Age-adjusted rates of personality disorders ranged from a low of 225 per 100,000 person-years (95% CI, 208-244) in the Air Force to a high of 782 (95% CI, 734-832) in the Navy (Table 3). The youngest age groups were at highest risk.

Age-adjusted first hospitalization rates for kidney infections ranged from a low of 197 per 100,000 person-years (95% CI, 180-217) in the Navy to a high of 354 (95% CI, 332-377) in the Army. Kidney infections generally were highest in the youngest women, and decreased steadily with age, followed by a slight rise in the oldest age groups in the Air Force and Army. Kidney infection rates had a weaker relationship with age in the Navy than in other services.

First hospitalization rates for five other diagnoses were investigated in this study. Age-specific incidence rates of cholelithiasis were similar among the three services through ages 25-29 years, then rose somewhat more steeply with age in Navy (Table 5). Incidence rates of cholecystitis were similar in the three services until ages 35-39 years, when rates in Navy women

increased more steeply (Table 6). First hospitalization rates of endometriosis generally increased with age through ages 40-44 years (Table 7). Age-specific first hospitalization rates of pelvic inflammatory disease tended to be high in all services. They increased steadily in Navy women, peaking at 1,739 per 100,000 person-years in the 40-44 year age group (Table 8). A similar pattern was present in Air Force and Army women, with higher rates in age groups from 25-44 years than in younger or older age groups. Prototype preliminary incidence rates of first hospitalizations for active-duty enlisted women, based on service-specific data sources, also are shown in Appendix Figure A-1.

## Discussion

This study was performed to demonstrate the feasibility of conducting cooperative multi-service research into women's health, and to develop standard methods for future medical research projects. The primary intent was to identify research-related issues, to define common terminology and objectives, and to develop standardized methods for conducting joint research. The primary objective of this study was to identify research-related issues, to define common terminology and objectives, and to develop standardized methods for conducting joint research. The data produced in carrying out this demonstration are preliminary and somewhat incomplete. Therefore, the data presented here should not be used to draw epidemiological inferences. After the services have gained more collective experience refining research standards and procedures, the focus can shift to research outcomes, epidemiological inferences, and implications for policy, prevention, and treatment of servicewomen. The results have provided a model for analysis of age groups of women who are at increased risk of various disorders within each service. Statistical testing (19-22) to compare age-specific and service-specific incidence rates was not an objective of this study, but could be performed in the future when the data have been confirmed further by additional analyses and validation. Some of the diagnoses that were studied are discussed briefly below.

### Psychological disorders

Adjustment reactions encompass clinically important emotional or behavioral symptoms in response to identifiable psychosocial stressors (23). A common form of adjustment disorder is reactive depression, which can occur in military women in response to family separation, deployment, or other stressors. These reactions are characterized by depressed mood, tearfulness, and feelings of hopelessness. In addition to these symptoms of reactive depression, adjustment reactions may include excessive anxiety, various disturbances of conduct, and maladaptive reactions, such as social withdrawal. Adjustment disorders can be acute (less than 6 months in duration) or chronic (6 months or longer). Personality disorders are also somewhat

common in young populations, and are characterized by an enduring pattern of inner experience and behavior that deviates markedly from cultural expectations, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to impairment or distress (23).

### Physical disorders

Five physical disorders were analyzed for purposes of example in this prototype study. A brief discussion follows of one of these disorders, kidney infections.

Kidney infections tended to have a U-shaped relationship with age, with highest rates in youngest and oldest age groups. A previous prospective study of women with *Escherichia coli* pyelonephritis reported that many women experience recurrent urinary tract infections that put them at risk of pyelonephritis (24). Despite treatment and repeated negative urine cultures, each woman had one to four new episodes caused by strains of *E. coli* identical to the strain that caused the initial episode (24). A study that followed infection-prone women for eight years reported that when the women were not receiving antimicrobial prophylaxis, urinary tract infections occurred at an average rate of 2.6 per year (25). These results suggest that the infecting strain of *E. coli* may survive to subsequently reinfect the woman, possibly in fecal flora. There have been few studies comparing the incidence rates of pyelonephritis and other urinary tract infections between genders. Recent reports on U.S. national data for inpatients discharged from short-stay non-federal hospitals in 1991 indicated a 4:1 ratio of female to male hospitalization rates for kidney infection (26). Recognition and control of urinary tract infections is important, since a high incidence can lead to increased health care costs and time lost from work, as well as pyelonephritis and further potential renal complications. Further research is needed to examine differences in first hospitalization rates among women for kidney infections and the other diseases studied in this prototype investigation. Additional discussion of the other diseases is not included here, since the purpose of this study was primarily to develop a model for further cooperative research on these and other diseases in military populations that differentially, or exclusively, affect women.

### Limitations

Several limitations should be considered when interpreting the results. Differences among services in incidence rates of first hospitalizations could have resulted from differences in whether, how, and when first diagnoses were identified and counted. Differences among the services encompass: (a) procedures for obtaining and key-entering data, including the proportion of records missing or having incomplete data, (b) procedures for counting hospitalizations, (c) whether

women with a particular disorder were hospitalized or treated instead in an outpatient setting, (d) certain conditions that may be differentially associated with discharge from the military before a first hospitalization occurs, (e) newly developed methods and data acquisition procedures that require further validation and optimization. Other limitations include the possibility of use of different criteria for making diagnoses and deciding whether patients should be hospitalized for a particular disorder and degree of severity, differences in how medical records were maintained, differential delays in obtaining hospitalization data, and different approaches to obtaining and calculating person-time population denominators used for calculation of incidence rates.

First hospitalization rates may not provide a complete picture of incidence rates for some of the diagnoses, since only inpatient admissions were included in this study. Outpatient visits and cases that never came to the attention of the health care system were not included. First hospitalization rates therefore represent only the most severe cases, and overall incidence rates of these diseases may, as a result, be under-reported. Furthermore, the degree of under-reporting probably is not uniform for all eight disorders studied, because some conditions such as cholelithiasis are very likely to result in hospitalization, while the psychological conditions that were investigated often are treated in outpatient facilities unless they are severe, and do not uniformly result in hospitalization (6). Also, some data were not uniformly available during the latter part of 1994. Finally, there may be service-specific factors, such as deployments aboard ships or in areas distant from hospitals that could differentially affect the likelihood of hospitalization according to service.

There are certain study design limitations that also should be considered when interpreting incidence rates of first hospitalization in the military populations studied. These include issues of stratification and adjustment for factors (other than age, which was taken into account) to better control for possible confounding. The hospitalization data were not stratified by—or adjusted for—such potentially important confounders as race, specific occupation within the service (different occupations may pose different risks of different disorders), or variation among services in the distributions of paygrade within the enlisted population. Further examination also is needed of the possibility of differences among the services in utilization of treatment by military women. Future analyses and additional studies can be designed to address these limitations.

Despite limitations, incidence rates of first hospitalization can characterize the most severe spectrum of illnesses and injuries affecting a population. Many previous studies have analyzed incidence rates based first hospitalizations to estimate the occurrence of cases serious enough to require hospitalization (10-14, 27-32). The ability of the Department of Defense to identify and

characterize the most serious medical problems facing active-duty servicewomen will be enhanced by collaborative epidemiologic research investigations such as the multi-service research collaboration that produced this prototype study. Future studies based on this model could have important implications for Air Force, Army, and Navy health care providers. For example, they may help drive preventive medicine efforts throughout the military, provide the basis for efficient planning and allocation of medical personnel and resources, and assist in maintaining military readiness. Finally, results of further research may be generalizable to all women, and could contribute to improvements in women's health, medical care, and quality of life.

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# PRELIMINARY FINDINGS

Table 1. Incidence rates of first hospitalizations for depressive type adjustment reactions (ICD-9 309.0-309.1) per 100,000 person years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Age in Years	Air Force					Army					Navy				
	No. of cases†	No. of person-years at risk‡	95 Percent confidence interval		Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval		Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval		Rate
			Lower	Upper				Lower	Upper				Lower	Upper	
17-19	116	22,496	428.0	620.8	515.7	236	26,964	759.7	1,007.4	875.2	117	24,495	391.1	564.0	477.7
20-21	100	41,171	198.7	296.3	242.9	280	52,044	474.5	610.1	538.0	110	42,167	212.1	309.5	260.9
22-24	118	56,764	172.9	249.9	207.9	261	65,802	349.8	449.7	396.6	83	53,648	121.4	187.9	154.7
25-29	107	67,750	130.0	191.6	157.9	268	74,195	318.6	409.6	361.2	80	53,679	116.4	181.6	149.0
30-34	40	47,644	59.9	114.2	84.0	120	51,040	195.8	282.1	235.1	46	27,818	117.6	213.0	165.4
35-39	32	32,769	66.8	138.1	97.7	77	27,890	216.7	350.6	276.1	19	11,958	87.6	229.8	158.9
40-44	11	10,322	53.2	190.8	106.6	24	8,439	182.3	423.8	284.4	4	3,278	4.6	238.8	122.0
45-61	1	1,085	2.3	513.4	92.2	9	2,423	170.1	705.9	371.5	1	831	0.0	240.7	120.4
Total	525	280,001	171.9	204.5	187.5	1,275	308,797	387.7	439.3	412.9	460	217,873	191.8	230.4	211.1
Age-adjusted rate§			178.4	213.1	195.0			391.0	443.0	416.4			181.3	218.5	199.0

\* Each service reported on its own personnel and hospitals (MTF's).

† Approximately three percent of diagnoses are unconfirmed.

‡ Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994.

§ Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 2. Incidence rates of first hospitalizations for all other and unspecified reactions (ICD-9 309.0-309.1), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Age in Years	Air Force						Army						Navy					
	No. of cases†	No. of person-years at risk‡	95 Percent confidence interval		No. of cases	No. of person-years at risk	95 Percent confidence interval		No. of cases	No. of person-years at risk	95 Percent confidence interval		Rate	No. of person-years at risk	95 Percent confidence interval		Rate	No. of person-years at risk
			Lower	Upper			Lower	Upper			Lower	Upper			Lower	Upper		
17-19	270	22,496	1,063.4	1,354.8	417	26,964	1,401.1	1,707.3	164	24,495	567.0	771.8	669.5	24,495	567.0	771.8	669.5	24,495
20-21	190	41,171	399.2	533.3	422	52,044	734.7	895.2	189	42,167	384.3	512.0	448.2	42,167	384.3	512.0	448.2	42,167
22-24	156	56,764	234.2	322.5	333	65,802	451.4	567.3	138	53,648	214.3	300.1	257.2	53,648	214.3	300.1	257.2	53,648
25-29	154	67,750	193.4	267.1	289	74,195	343.5	441.7	131	53,679	202.2	285.8	244.0	53,679	202.2	285.8	244.0	53,679
30-34	67	47,644	109.8	179.9	164	51,040	274.4	376.2	68	27,818	186.3	302.4	244.5	27,818	186.3	302.4	244.5	27,818
35-39	35	32,769	74.5	148.5	79	27,890	222.4	359.8	21	11,958	100.6	250.2	175.6	11,958	100.6	250.2	175.6	11,958
40-44	19	10,322	110.8	287.2	30	8,439	240.0	508.4	7	3,278	56.7	369.4	213.5	3,278	56.7	369.4	213.5	3,278
45-61	0	1,085	0.0	0.0	3	2,423	25.5	361.5	0	831	0.0	0.0	0.0	831	0.0	0.0	0.0	831
Total	891	280,001	297.7	340.0	1,737	308,797	528.2	598.5	718	217,873	305.4	353.6	329.6	217,873	305.4	353.6	329.6	217,873
Age-adjusted rate§			334.8	312.0	358.9		569.3	534.6	605.7		304.9	282.9	328.7		282.9	328.7		

\*Each service reported on its own personnel and hospitals (MTF's)

†Approximately three percent of diagnoses are unconfirmed.

‡Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population

# PRELIMINARY FINDINGS

Table 3. Incidence rates of first hospitalizations for personality disorders (ICD-9 301), per 100,000 person-years, in active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Air Force										Army						Navy																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Age in Years	No. of cases†	No. of person-years at risk‡	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. of person-years at risk

\*Each service reported on its own personnel and hospitals (MTF's)

†Approximately three percent of diagnoses are unconfirmed.

‡Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 4. Incidence rates of first hospitalizations for kidney infections (ICD-9 590), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Air Force										Army										Navy									
Age in Years	No. of cases†	No. person-years at risk‡	Rate		95 Percent confidence interval		No. of cases	No. person-years at risk	Rate		95 Percent confidence interval		No. of cases	No. person-years at risk	Rate		95 Percent confidence interval												
			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			Lower	Upper													
17-19	132	22,496	586.8	492.7	698.5	164	26,964	608.2	519.4	712.2	57	24,495	232.7	172.3	292.9														
20-21	169	41,171	410.5	352.0	478.6	286	52,044	549.5	484.7	623.1	122	42,167	289.3	238.0	340.6														
22-24	158	56,764	278.4	237.4	326.3	263	65,802	399.7	352.5	453.3	130	53,648	242.3	200.6	283.9														
25-29	140	67,750	206.6	174.4	244.7	210	74,195	283.0	245.6	325.7	83	53,679	154.6	121.3	187.8														
30-34	60	47,644	125.9	97.0	163.7	105	51,040	205.7	168.3	251.0	44	27,818	158.2	111.4	204.7														
35-39	30	32,769	91.6	61.8	130.9	43	27,890	154.2	110.1	209.7	17	11,958	142.2	74.7	209.2														
40-44	11	10,322	106.6	53.2	190.8	10	8,439	118.5	56.9	218.0	6	3,278	183.0	38.1	327.0														
45-61	2	1,85	184.3	22.3	665.4	4	2423	165.1	44.9	422.7	1	831	120.4	0.0	240.7														
Total	702	280,001	250.7	232.7	270.2	1,085	308,797	351.4	330.0	373.9	460	217,873	211.1	191.8	230.4														
Age-adjusted rate§			262.8	243.9	283.3			354.0	332.4	376.7			197.3	179.7	216.6														

\*Each service reported on its own personnel and hospitals (MTF's)

†Approximately three percent of diagnoses are unconfirmed.

‡Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 5. Incidence rates of first hospitalizations for cholelithiasis (ICD-9 574), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Air Force											Army					Navy				
Age in Years	No. of cases†	No. person-years at risk‡	95 Percent confidence interval		Rate	No. of cases	No. person-years at risk	95 Percent confidence interval		Rate	No. of cases	No. person-years at risk	95 Percent confidence interval		Rate	No. of cases	No. person-years at risk	95 Percent confidence interval		
			Lower	Upper				Lower	Upper				Lower	Upper				Lower	Upper	
17-19	7	22,496	12.5	64.1	31.1	12	26,964	23.0	77.9	44.5	12	26,964	23.0	77.9	49.0	12	24,495	21.4	76.4	
20-21	64	41,171	120.6	200.2	155.5	55	52,044	78.4	139.5	105.7	60	42,167	78.4	139.5	142.3	60	42,167	106.3	178.2	
22-24	71	56,764	98.4	158.6	125.1	95	65,802	116.8	179.1	144.4	106	53,648	116.8	179.1	197.6	106	53,648	160.0	235.1	
25-29	123	67,750	151.5	217.4	181.6	108	74,195	119.1	177.6	145.6	83	53,679	119.1	177.6	154.6	83	53,679	121.3	187.8	
30-34	85	47,644	143.4	222.1	178.4	72	51,040	110.8	179.2	141.1	80	27,818	110.8	179.2	287.6	80	27,818	224.5	350.5	
35-39	54	32,769	124.1	216.2	164.8	54	27,890	143.7	255.6	193.6	38	11,958	143.7	255.6	317.8	38	11,958	216.8	418.4	
40-44	22	10,322	133.6	321.8	213.1	22	8,439	163.5	393.7	260.7	10	3,278	163.5	393.7	305.1	10	3,278	117.0	492.0	
45-61	3	1,085	57.0	807.4	276.5	9	2,423	170.1	705.9	371.5	6	831	170.1	705.9	722.1	6	831	150.5	1,290.0	
Total	429	280,001	139.3	168.6	153.2	427	308,797	125.3	152.7	138.3	395	217,873	125.3	152.7	181.3	395	217,873	163.4	199.2	
Age-adjusted rates§			135.4	164.9	149.4			124.1	151.2	137.0			124.1	151.2	189.9			170.7	211.2	

\*Each service reported on its own personnel and hospitals (MTF's)

†Approximately three percent of diagnoses are unconfirmed.

‡Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 6. Incidence rates of first hospitalizations for cholecystitis (ICD-9 575.0-575.1), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Air Force										Army						Navy					
Age in Years	No. of cases†	No. of person-years at risk‡	Rate		95 Percent confidence interval		No. of cases	No. of person-years at risk	Rate		95 Percent confidence interval		No. of cases	No. of person-years at risk	Rate		95 Percent confidence interval				
			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper									
17-19	1	22,496	4.5	0.1	24.8		6	26,964	22.3	8.2	48.6		5	24,495	20.4	2.8	38.0				
20-21	13	41,171	31.6	16.8	54.0		11	52,044	21.1	10.5	37.8		11	42,167	26.1	10.7	41.3				
22-24	14	56,764	24.7	13.5	41.4		17	65,802	25.8	15.0	41.3		14	53,648	26.1	12.5	39.6				
25-29	13	67,750	19.2	10.2	32.8		33	74,195	44.5	30.0	63.6		13	53,679	24.2	11.1	37.3				
30-34	20	47,644	42.0	25.7	64.7		14	51,040	27.4	15.0	46.0		5	27,818	18.0	2.4	33.4				
35-39	10	32,769	30.5	14.7	56.2		6	27,890	21.5	7.9	46.9		13	11,958	108.7	49.8	167.3				
40-44	5	10,322	48.4	15.7	112.9		2	8,439	23.7	2.9	85.6		4	3,278	122.0	4.6	238.8				
45-61	2	1,085	184.3	22.3	665.4		1	2,423	41.3	1.0	230.0		0	831	0.0	0.0	0.0				
Total	78	280,001	27.9	22.2	34.9		90	308,797	29.2	23.6	36.2		65	217,873	29.8	22.6	37.1				
Age-adjusted rate§			27.2	21.4	34.5				29.0	23.5	36.0				31.1	23.9	40.4				

\*Each service reported on its own personnel and hospitals (MTF's)

† Approximately three percent of diagnoses are unconfirmed.

‡ Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§ Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 7. Incidence rates of first hospitalizations for endometriosis (ICD-9 617), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

Age in Years	Air Force						Army						Navy					
	No. of cases†	No. of person-years at risk‡	Rate		95 Percent confidence interval		No. of cases	No. of person-years at risk	Rate		95 Percent confidence interval		No. of cases	No. of person-years at risk	Rate		95 Percent confidence interval	
			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper
17-19	28	22,496	124.5	82.8	180.5	43	26,964	159.5	113.9	216.9	25	24,495	102.1	62.1	141.8			
20-21	70	41,171	170.0	133.5	215.9	123	52,044	236.3	196.8	283.6	72	42,167	170.8	131.3	210.1			
22-24	145	56,764	255.4	216.2	301.6	182	65,802	276.6	238.4	320.9	102	53,648	190.1	153.2	227.0			
25-29	247	67,750	364.6	321.3	413.8	319	74,195	430.0	383.6	482.0	191	53,679	355.8	305.3	406.2			
30-34	214	47,644	449.2	391.6	514.9	262	51,040	513.3	452.7	582.1	187	27,818	672.2	575.8	768.4			
35-39	183	32,769	558.5	481.9	647.1	184	27,890	659.8	568.7	765.4	150	11,958	1,254.4	1,053.5	1,454.8			
40-44	56	10,322	542.5	411.7	709.6	62	8,439	734.7	565.7	955.1	46	3,278	1,403.3	997.7	1,807.3			
45-61	9	1,085	829.5	379.9	1,576.0	15	2,423	619.1	346.7	1,021.5	6	831	722.1	150.5	1,290.0			
Total	952	280,001	340.0	318.8	362.4	1,190	308,797	385.4	361.9	410.1	779	217,873	357.6	332.4	382.6			
Age-adjusted rate§			319.9	299.4	341.7			381.4	358.1	405.8			395.2	366.7	426.0			

\*Each service reported on its own personnel and hospitals (MTF's)

†Approximately three percent of diagnoses are unconfirmed.

‡Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.

# PRELIMINARY FINDINGS

Table 8. Incidence rates of first hospitalizations for pelvic inflammatory disease (ICD-9 614), per 100,000 person-years, active duty enlisted Air Force, Army, and Navy women, 1990-1994\*

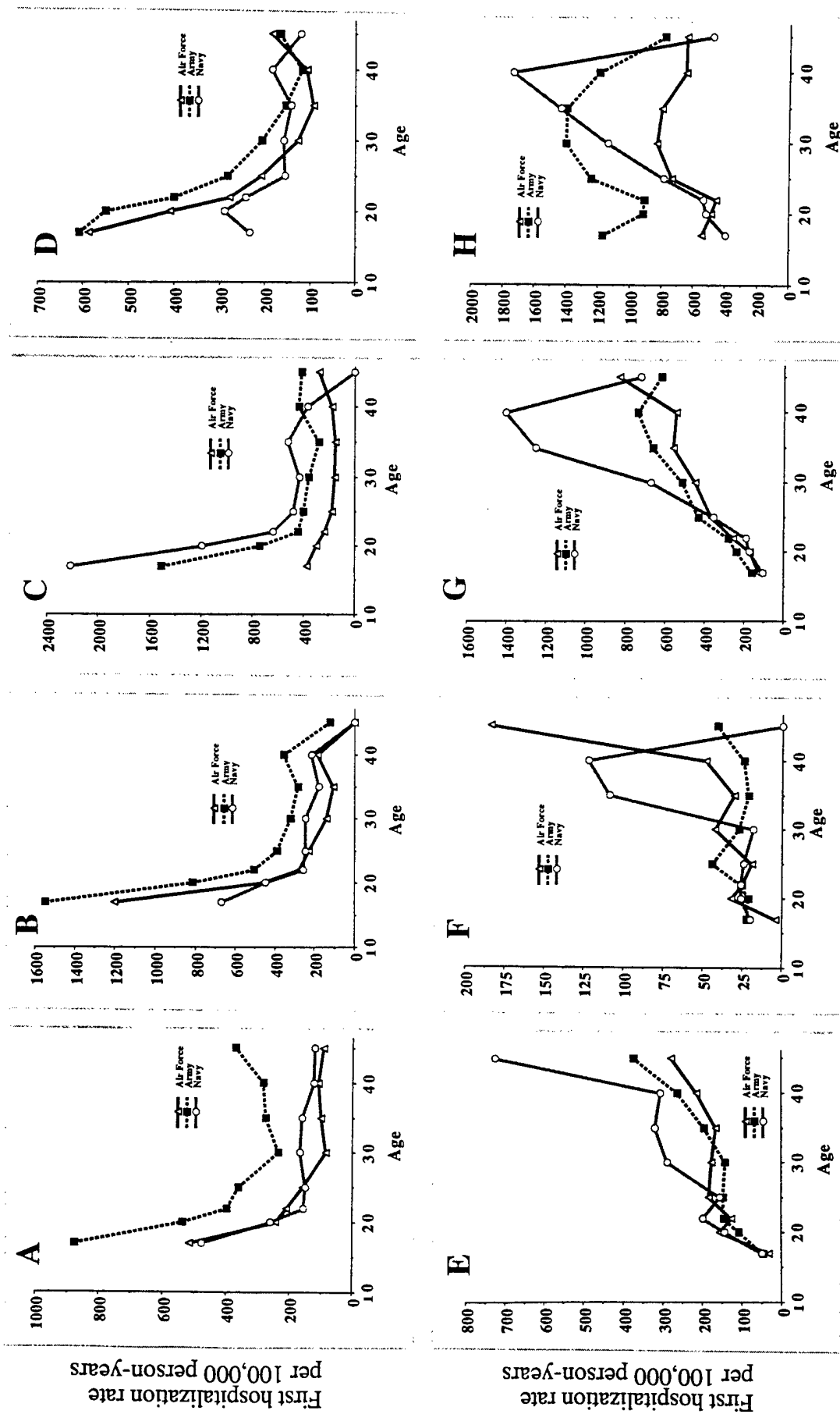
Age in Years	Air Force						Army						Navy					
	No. of cases†	No. person-years at risk‡	95 Percent confidence interval			Rate	No. of cases	No. person-years at risk	95 Percent confidence interval			Rate	No. of cases	No. person-years at risk	95 Percent confidence interval			Rate
			Lower	Upper	Upper				Lower	Upper	Upper				Lower	Upper	Upper	
17-19	123	22,496	456.4	654.8	654.8	546.8	316	26,964	1,045.3	1,313.7	1,313.7	1,171.9	97	24,495	317.2	474.6	474.6	
20-21	200	41,171	421.7	559.1	559.1	485.8	476	52,044	833.2	1,004.2	1,004.2	914.6	219	42,167	450.6	588.1	588.1	
22-24	258	56,764	401.6	514.5	514.5	454.5	598	65,802	831.6	993.3	993.3	908.8	289	53,648	476.6	600.7	600.7	
25-29	497	67,750	671.1	802.0	802.0	733.6	922	74,195	1,163.2	1,327.2	1,327.2	1,242.7	423	53,679	712.9	863.1	863.1	
30-34	395	47,644	750.6	916.0	916.0	829.1	716	51,040	1,301.8	1,512.2	1,512.2	1,402.8	317	27,818	1,014.0	1,264.9	1,264.9	
35-39	262	32,769	707.1	904.2	904.2	799.5	390	27,890	1,257.2	1,555.0	1,555.0	1,398.4	172	11,958	1,223.3	1,653.0	1,653.0	
40-44	67	10,322	506.6	830.2	830.2	649.1	101	8,439	979.1	1,460.2	1,460.2	1,196.9	57	3,278	1,287.3	2,188.8	2,188.8	
45-61	7	1,085	258.7	1,329.0	1,329.0	645.2	19	2,423	472.1	1,233.4	1,233.4	784.2	4	831	18.2	942.1	942.1	
Total	1,809	280,001	616.4	675.8	675.8	646.1	3,538	308,797	1,075.8	1,219.0	1,219.0	1,145.7	1,578	217,873	688.5	760.0	760.0	
Age-adjusted rate§			591.7	670.4	670.4	630.1			1,071.7	1,214.3	1,214.3	1,141.3			707.0	801.1	801.1	

\*Each service reported on its own personnel and hospitals (MTF's)

† Approximately three percent of diagnoses are unconfirmed.

‡ Air Force estimated person-years at risk by summing end-of-year annual strength for the five years, 1990-1994

§ Age adjustment was performed using indirect standardization. The active duty enlisted female military population (all three services combined) was used as the standard population.



Appendix Figure A-1. Prototype preliminary data displays from service-specific data sources—Preliminary incidence rates of first hospitalization per 100,000 person-years, eight disorders, active-duty enlisted Air Force, Army, and Navy women, 1990-1994. (Type of disorder: A. Depressive type adjustment reactions, B. All other and unspecified adjustment reactions, C. Personality disorders, D. Kidney infections, E. Cholelithiasis, F. Cholecystitis, G. Endometriosis, H. Pelvic inflammatory disease)

## **APPENDIX D**

### **ADDITIONAL PROTOTYPE REPORT PLANS**

**Prototype Report Plan: A NINE-YEAR PROFILE OF ACCIDENT AND INJURY HOSPITALIZATIONS**

E.K.E. Gunderson, Ph.D. & A.D. Unseth, M.A.

**Problem**

Accidents and injuries are responsible for a significant percentage of hospital admissions among enlisted U.S. Navy personnel. Optimal military readiness requires that these hospitalized individuals be effectively treated and returned to duty as soon as possible. The approximate length of hospital stay for accidents and injuries should be of interest to commanding officers.

**Objective**

The purpose of this present study was to develop a profile of accident and injury hospitalizations over a nine-year period. This study would identify the lengths of hospital stays during first enlistments of Navy personnel from 1980 through 1988. Our goal was to identify trends of specific diagnoses that would serve as possible projections of future hospital stays for accidents and injuries.

**Approach**

Data used for this study consisted of medical inpatient and career history information extracted from the CHAMPS Research Database maintained at the Naval Health Research Center in San Diego, CA. All personnel who enlisted between 1980 and 1988 were identified from career history files. Their records of hospital admissions for traumatic injuries during their first four-year enlistment period were extracted for the period 01 January 1980 to 31 December 1992. To examine the temporal impact on length of hospitalization, the population was divided into nine cohort groups of personnel who enlisted from 1980 to 1988. The variable included diagnosis, sex, age, occupation, activity code, cause code, occupationally related, term of enlistment, loss code, and surgical procedure.

## UNIVARIATE EFFECTS SUMMARY: Sex - Age

Accidents/Poisoning/Violence  
Cases per 10000 Person-Years at Risk  
Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits	
					Lower	Upper
Male	17-19	21251	765344	277.67	273.93	281.40
	20-21	38303	1265849	302.59	299.56	305.62
	22-24	38178	1440172	265.09	262.43	267.75
	25-29	28196	1406711	200.44	198.10	202.78
	30-34	13446	900872	149.26	146.73	151.78
	35-39	7784	627192	124.11	121.35	126.87
	40-44	2807	254908	110.12	106.04	114.19
	45-61	961	78235	122.84	115.07	130.60
Total		150926	6739284	223.95	222.82	225.08
Female	17-19	1954	75262	259.63	248.11	271.14
	20-21	2545	129560	196.43	188.80	204.06
	22-24	2705	164836	164.10	157.92	170.28
	25-29	2360	164932	143.09	137.32	148.86
	30-34	1131	85473	132.32	124.61	140.03
	35-39	516	36742	140.44	128.32	152.55
	40-44	123	10072	122.12	100.53	143.66
	45-61	34	2553	133.18	88.42	177.74
Total		11368	669429	169.82	166.69	172.94
Total		162294	7408712	219.06	217.99	220.12

## UNIVARIATE EFFECTS SUMMARY: Sex - Grade

Accidents/Poisoning/Violence  
Cases per 10000 Person-Years at Risk  
Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits	
					Lower	Upper
Male	E1	13138	495472	265.16	260.63	269.69
	E2	21846	611240	357.40	352.67	362.14
	E3	34142	1078561	316.55	313.19	319.91
	E4	33816	1358653	248.89	246.24	251.55
	E5	25597	1372202	186.54	184.25	188.82
	E6	15395	1131406	136.07	133.92	138.22
	E7	4930	483872	101.89	99.04	104.73
	E8	1427	143173	99.67	94.50	104.84
	E9	635	64726	98.11	90.47	105.73
Total		150926	6739304	223.95	222.82	225.08
Female	E1	1415	54169	261.22	247.61	274.82
	E2	1790	67308	265.94	253.62	278.26
	E3	3072	154066	199.40	192.34	206.45
	E4	2487	159273	156.15	150.01	162.28
	E5	1729	145230	119.05	113.44	124.66
	E6	685	70091	97.73	90.41	105.05
	E7	158	16014	98.66	83.27	114.02
	E8	29	2728	106.31	67.64	144.81
	E9	3	530	56.57	0.00	113.13
Total		11368	669408	169.82	166.70	172.94
Total		162294	7408712	219.06	217.99	220.12

## UNIVARIATE EFFECTS SUMMARY: Sex - Platform

Accidents/Poisoning/Violence  
Cases per 10000 Person-Years at Risk  
Confidence Level: 95.00%

Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits	
					Lower	Upper
Male	CV	9183	352872	260.24	254.91	265.56
	CVN	3703	184369	200.85	194.38	207.31
	BB/CG	4416	169937	259.86	252.20	267.52
	CGN	1567	69123	226.70	215.47	237.92
	DD/FF	17497	587055	298.05	293.63	302.46
	SURFACE	601	20549	292.47	269.08	315.84
	ASSAULT	9479	340391	278.47	272.87	284.08
	SUPPORT	8263	327144	252.58	247.13	258.02
	REPLENSH	5342	190035	281.11	273.57	288.64
	CARGO	0	67	0.00	0.00	0.00
	SS	145	4681	309.76	259.32	360.10
	SSN	2645	162992	162.28	156.09	168.46
	SSBN	2081	132481	157.08	150.33	163.83
	AUX	475	23621	201.09	183.00	219.16
	MISC	8	827	96.76	30.19	162.91
	OTHER	25	1363	183.47	111.61	254.98
	ASHORE	85496	4058619	210.65	209.24	212.06
	UNKNOWN	0	113180	0.00	0.00	0.00
	Total		150926	6739304	223.95	222.82
Female	CV	3	357	84.00	0.00	167.99
	CVN	0	132	0.00	0.00	0.00
	BB/CG	0	1	0.00	0.00	0.00
	CGN	0	7	0.00	0.00	0.00
	DD/FF	11	368	299.19	123.15	474.14
	SURFACE	0	245	0.00	0.00	0.00
	ASSAULT	1	157	63.51	0.00	127.02
	SUPPORT	1225	61159	200.30	189.08	211.51
	REPLENSH	150	6321	237.30	199.30	275.21
	CARGO	0	13	0.00	0.00	0.00
	SSN	0	226	0.00	0.00	0.00
	SSBN	0	625	0.00	0.00	0.00
	AUX	8	489	163.64	51.06	275.51
	MISC	0	69	0.00	0.00	0.00
	OTHER	0	21	0.00	0.00	0.00
	ASHORE	9970	581274	171.52	168.15	174.89
	UNKNOWN	0	17943	0.00	0.00	0.00
	Total		11368	669408	169.82	166.70
Total		162294	7408712	219.06	217.99	220.12

**Prototype Report Plan: COMPREHENSIVE GENDER-SPECIFIC ASSESSMENT OF ILLNESSES AND INJURY INCIDENCE RATES****Problem**

Certain illnesses are known to have higher incidence and hospitalization rates in women than in men, while some disorders may have higher rates in men. No previous study in military has comprehensively identified the overall incidence of illnesses that are more common in women compared to men, since previous studies have been limited to a single data source. Comprehensive incidence rates would be useful in planning preventive strategies, and in providing adequate and appropriately trained treatment personnel and facilities for both genders.

**Objective**

The purpose of this study is to provide a comprehensive assessment of incidence of disease by gender in active-duty Navy personnel. This assessment will incorporate hospitalization data from the CHAMPS Research Database, the Shipboard Automated Medical System (SAMS) in use aboard selected ships, other shipboard medical data, and outpatient data from Naval Medical Center outpatient visit tapes.

**Approach**

The CHAMPS Research Database will be used to identify the 250 most common disease accounting for hospitalization of active duty Navy personnel during 1990-1994. First and subsequent hospitalization rates will be examined by gender, age, race, and, for shipboard personnel, platform type. In addition, the SAMS system will be used to identify the 100 most common disease diagnoses accounting for sick call visits or medevac during deployment; the 100 most diagnoses accounting for sick call visits at other times; and the 100 most common illnesses accounting for outpatient visits at Navy Hospitals in San Diego, Bethesda (NNMC), and Portsmouth. In addition, this study will integrate data from inpatient, sick call, and outpatient computer-based records to provide the most comprehensive analysis possible of incidence of disease in Navy women. Covariates will include occupation (rating), pay grade, work division, and activity code. This study will also examine length of hospitalization for the most common diseases, and discharges from the Navy subsequent to those diagnoses, in order to identify the diagnoses that account for the greatest loss of time and personnel, according to gender and reason for loss (Navy and Department of Defense loss codes)

**Background**

A previous study examined gender-specific sick call visit rates based on manually-maintained research sick call logs (1, 2), and another study used extracts of women's hospitalizations from the Navy Enlisted Career History File (3). According to reports by Hoiberg, the overall hospitalization rate for Navy enlisted women was approximately twice that of enlisted men (4, 5) (hospitalizations for pregnancy appear to have been included in those estimates). Preliminary data suggest that during 1980-1992 the overall hospitalization rate for Navy enlisted women was approximately 2.5 times that of enlisted men (Gunderson EKE, Unseth A. Personal communication, 1995). The existing studies

have not attempted to link two or more major data bases. Both studies were completed before routine assignment of women to aircraft carriers and other combat ships.

### **Preliminary Data**

The CHAMPS Research Database was used to identify first hospitalization rates of several diseases believed to be more common in women, or that occur only in women, for purposes of preliminary analysis. The time interval was 1980-1993. First hospitalization rates of these diseases were then computed by gender (Table 1). Supplementary analyses were performed according to age, race, occupation (rating) and platform (aircraft carrier-nuclear, aircraft carrier-nonnuclear, battleship, destroyer, submarine, ashore, etc.) (not shown).

The preliminary data revealed two relatively common behavioral or mental disorders with significantly higher hospitalization rates in women, specifically, adjustment reactions and personality disorders (Table 1). By contrast, the incidence of hospitalization for alcohol dependence syndrome was slightly, but not significantly, lower in women. The incidence rate of cholelithiasis was 4.4 times higher in women, and the first hospitalization rate for acquired deformities of the toes was seven times higher in women than men. The higher rate of cholelithiasis is consistent with the higher hospitalized incidence rate of this disorder in women than men in the Civilian population. Hospitalization for pelvic inflammatory disease and endometriosis was common in women.

### **Research Plan**

#### **Gender-specific first hospitalization rates**

The project will identify the 150 diseases accounting for the most first hospitalizations in both genders, and the 150 most common diagnoses within each gender. Ratios of female to male rates will be calculated. Diseases with significantly higher rates in either gender will be identified. These will be further analyzed by age, pay grade, occupation (rating), platform, and other covariates in order to determine if the observed differences can be accounted for by differences in covariates. The analyses will include person-years and multiple logistic regression techniques to help isolate sources of variation.

#### **Gender-specific combined sick call, medevac, and hospitalization rates**

A cohort of women and men will be identified for whom both SAMS and CHAMPS data are available. These data will be made available from the companion shipboard study. The time intervals for which SAMS data are available will be used to define a subset with both SAMS and hospitalization data. This subset will be used to analyze the combined data on sick call visits, medevacs, and hospitalizations.

#### **Gender-specific combined outpatient and hospitalization visit rates**

Using the CHAMPS Research Database, a cohort of active-duty women and men will be identified who are assigned to units located within the defined catchment areas or the outpatient departments of Navy hospitals in San Diego, Bethesda (NNMC), and

Portsmouth, and have lived in the area for at least one year preceding the years of study. Outpatient visit rates will be determined using a person-years approach according to gender, age, pay grade, occupation (rating), race, and other characteristics, and the 100 diagnoses accounting for the most outpatient visits will be determined, along with gender ratios. This approach will take into account different amounts of time that each patient is assigned to the catchment area. The outpatient data for the individuals in the defined geographic areas will be incorporated into the CHAMPS Research Database for a more comprehensive analysis of incidence of disorders requiring either hospitalization or referral to a hospital outpatient department within the defined catchment areas, and incidence rates including both outpatient diagnoses and hospitalizations will be estimated. For this purpose, second and subsequent visits or hospitalizations for chronic disorders will be excluded in order to prevent duplicate counting of incidence. This will be done by examining all outpatient visits and hospitalizations for each patient during the previous year. Rates also will be analyzed according to time and distance in miles from the patient's base and residence to the facility, and, where necessary, data from branch clinics will be incorporated into the analyses. This project will be valuable in identifying diseases that are serious enough to require the specialty care provided in hospital outpatient departments, but which do not necessarily result in hospitalization. Examples include a wide range of female menstrual and reproductive disorders, endometriosis, arthritis, migraines, and early manifestations of cardiovascular and renal diseases.

#### **Technical reports**

This project will produce three technical reports that will be designed to serve as prototypes for future tri-service reports based on the Centralized Tri-service Relational Database. Each report will incorporate templates for the production of statistical tables and will provide detailed examples of statistical analysis procedures, including the use of person-years.

Table 1. Incidence rates of first hospitalization for selected diagnoses per 100,000 person-years, by diagnosis and gender, U.S. Navy enlisted personnel, 1990-1993.

Diagnosis	Women		Men		Ratio of rate in women to rate in men	
	No.	Rate	No.	Rate	Ratio	P
Cholelithiasis (ICD-9 574)	638	104.5	1,491	23.8	4.4	0.001
Adjustment Reactions (ICD-9 309)	2,371	388.4	11,475	183.2	2.1	0.001
Personality Disorders (ICD-9 301)	3,408	558.4	21,862	349.0	1.6	0.001
Acquired deformities of the toes (ICD-9 735)	353	57.8	522	8.3	7.0	0.001
Pelvic inflammatory disease (ICD-9 614)	2,798	458.4	-	-	-	-
Endometriosis (ICD-9 617)	1,110	181.9	-	-	-	-
Alcohol dependence syndrome (ICD-9 303)	48	7.9	553	8.8	0.9	NS

**APPENDIX E**

**DATA REQUIREMENTS DOCUMENT**  
**FOR THE NAVY ENLISTED LONGITUDINAL DATABASE**  
(Abridged version)

Complete appendix is available on request.

DATA REQUIREMENTS  
DOCUMENT  
for the  
CHAMPS  
(CAREER HISTORY ARCHIVAL  
MEDICAL AND PERSONNEL SYSTEM )  
RESEARCH DATABASE  
(Abridged version)

Complete version is available on request

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## SECTION 1

### GENERAL

#### 1.1 PURPOSE OF THE DATA REQUIREMENTS DOCUMENT

This Data Requirements Document (DRD) for the Career History Archival Medical and Personnel System (CHAMPS) is written to fulfill the following objectives:

- To provide a detailed definition of the data requirements for CHAMPS and the sources of the data,
- To communicate details of the on-going analysis between the user's operational personnel and the appropriate development personnel.

#### 1.2 ENVIRONMENT

CHAMPS is a computerized medical and personnel database that provides extensive information for Naval medical management for occupational health and epidemiologic research. The database is being expanded to include Navy officers and Marine Corps officer and enlisted personnel. The system has been developed by the Naval Health Research Center (NHRC), San Diego, CA, in association with the Air Force and Army. The mission of the Naval Health Research Center, as assigned by the Secretary of the Navy, and two of the functions to be performed to accomplish the mission, as assigned by the Commander, Naval Medical Command (NHRCINST 5450.1E), are:

To support fleet operational readiness through research, development, testing, and evaluation on the biomedical and psychological aspects of Navy and Marine Corps personnel health and performance, and to perform such other functions or tasks as may be directed by higher authority.

As directed by the Commanding Officer, Naval Medical Research and Development Command, Bethesda, Maryland:

a. Conduct occupational health and safety studies of the Naval service to: identify environmental hazards in the workplace and aboard ship; assess the impact of potentially harmful agents or conditions on health and performance; determine causal factors in illness and accidents; and to develop cost-effective intervention strategies.

b. Maintain data files of medical and service history information for all Naval personnel to: serve as the basis for longitudinal health studies on morbidity, disability, and mortality in relation to demographic, occupational, environmental, psychological, and service history variables; identify health and safety risks to Naval personnel; and to assess the impact of chronic disease on performance and retention.

### 1.3 REFERENCES

a. Documentation for CHAMPS will be in accordance with:

- (1) Life Cycle Management of Automated Information Systems, DoD Directive 7920.1, 17 October 1978;
- (2) DoD Automated Information Systems Documentation Standards Manual, DoD STD 7935A, 31 October 1988; and
- (3) DoD Automated Information System Life Cycle Management Manual, DoD Manual 7920.2M, 1 March 1990.
- (4) *Guidelines For Documentation of Computer Programs and Automated Data Systems.*

b. The following documents were used as references for this DRD:

- (1) A Guide to the Computerized Medical Data Resources of the Naval Health Research Center, Report Number 87-13.

#### 1.4 APPENDICES

Appendix A lists acronyms and abbreviations.

Appendix B lists file and record layouts.

Appendix C lists data elements.

Appendix D lists static data elements.

## SECTION 2

### DATA DESCRIPTION

#### 2.1 STATIC DATA

Static data consists of validation and conversion tables used by the programs to validate input data and convert coded data to descriptions. Each validation/conversion table is described in detail in the following paragraphs. The static data used by CHAMPS is shown in Appendix D.

##### 2.1.1 Accounting Category Code

The Accounting Category Code is a two position numeric field which reflects the reason a member is attached to an activity (UIC). Valid values for Accounting Category Code are listed in Appendix D.

##### 2.1.2 Attrition Indicator

The Attrition Indicator validation table is used to validate the attrition codes in the update transactions. Appendix D lists valid codes for Attrition Indicator.

##### 2.1.3 Branch Class From

Branch and Class From is a two position numeric field which indicates the branch and component of service in which a member was last discharged from or served with. Valid values for Branch and Class from are listed in Appendix D.

##### 2.1.4 Designator Code

Designator Code is a four position numeric field which indicates the occupational job in which a Naval officer is currently serving. The first 3 characters

define the officer's type of duty, the last character defines the status of the officer. Valid Designator Codes are listed in Appendix D.

#### 2.1.5 DoD Death Loss Code

DoD Death Loss Code is a three position numeric field that indicates the members DoD Death Loss Code. This code reflects the cause of death during active duty. Valid values for DoD Death Loss Code are listed in Appendix D.

#### 2.1.6 DoD Loss Code

The DoD Loss Code validation table is used to validate the DoD Loss Codes coded in the update transactions. Appendix D lists valid codes for DoD Loss Codes.

#### 2.1.7 Event Code

The Event Code table lists the event codes and associated descriptions. Events within the CHAMPS database are used to indicate specific events during the careers of military members. The values for Event Code are listed in Appendix D.

#### 2.1.8 Home Port

Home Port is a two position numeric field which identifies the home port of the vessel the member is currently assigned to. This table is used to validate home port data in the input data files. Valid values for Home Port are listed in Appendix D.

#### 2.1.9 Navy Enlisted Classification

Navy Enlisted Classification (NEC) is a four position alphanumeric field which indicates a primary special knowledge or skill for manpower management usage. Data from all NEC manuals available from 1965 to 1985 have been entered into the computer. Valid values for NEC are listed in Appendix D.

#### 2.1.10 Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator

A two position alphanumeric field which indicates one of Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator (AEF). If the element is numeric, it will contain the nuclear field program loss indicator. If the first position contains an 'E', this element will contain the advanced electronics field indicator (AEF) data. This table is used to validate the NUC AEF Indicator field in input records. Valid values for this field are listed in Appendix D.

#### 2.1.11 Onboard Activity Code

Onboard Activity Code is a ten position numeric field which identifies the activity to which a member is currently attached; the following is a breakdown of this code. Valid values for Onboard Activity Code are listed in Appendix D.

#### 2.1.12 Original DoD Loss Code

Original DoD Loss Code is a three position alphanumeric field indicating the members original DOD loss (Navy enlisted) code. Valid values for this field are listed in Appendix D.

#### 2.1.13 Projected Rate Code

The Projected Rate Code validation table is used to validate the occupation rate in which an enlistment/reenlistment is being made in the update transactions. Appendix D lists valid codes for Projected Rate Code.

#### 2.1.14 Rate Code

The Rate Code validation table is used to validate the rate codes in the update transactions. Appendix D lists valid codes for Rate Code.

#### 2.1.15 Recruit School

The Recruit School validation table is used to validate the type of program/school guarantees codes in the update transactions. Appendix D lists valid codes for Recruit School.

#### 2.1.16 Recruit Type Enlistment

The Recruit Type Enlistment validation table is used to validate the enlistment status codes in the update transactions. Appendix D lists valid codes for Recruit Type of Enlistment.

#### 2.1.17 Reporting Facility

Admitting Facility or Reporting Facility is a five position alphanumeric field showing the Unit Identification Code (UIC) used to identify each activity in the U. S. Navy. Valid values for Reporting Facility are listed in Appendix D.

#### 2.1.18 Re-enlistment QC Code

The Re-enlistment Quality Control Code validation table is used to validate the type re-enlistment recommendation codes in the update transactions. Appendix D lists valid codes for Re-enlistment Quality Control Code.

#### 2.1.19 Social Security Number

The Social Security Number (SSN) table is used to validate the first three digits of SSNs of the update transactions. Appendix D shows valid values for the first three digits of SSN and the states for which the values are valid.

#### 2.1.20 State Code

The state code validation table is used to validate the numeric value in the state code data element for validity. State code is a two position code which indicates the state or U.S. possession which is a member's home of record at the time of initial entry into the service. Appendix D shows valid values for state codes.

#### 2.1.21 Type Acquisition Code

The Type of Acquisition of an Enlistee Code is a two position numeric field which indicates the type of acquisition of an enlistee. Valid values for this field are listed in Appendix D.

#### 2.1.22 Type Enlistment

Type Enlistment is a two position numeric field which indicates the types of various gains/accessions.

### 2.2 DYNAMIC INPUT DATA

The CHAMPS database is comprised one large flat data file which is used to maintain data for longitudinal health studies. This file, the CHAMPS database, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. The file is to be modified to contain Navy officers as well as Marine Corp officers and enlisted personnel. Ultimately, Army and Air Force data will be included. This file is updated quarterly from data files received from other organizations. These files are reformatted into a common record format which is then used to update the master CHAMPS database. In addition, there are supporting data files which are used in conjunction with the CHAMPS database for research and analysis. One of the supporting files is the Population Denominator Count File. Input data files that are used to update CHAMPS are: Quarterly Navy Enlisted Active Duty Update, Monthly

Navy Enlisted Attrition and Accession, Navy Officer Active Duty Update, Navy Officer Attrition, Navy Reserve, Marine Corps Enlisted and Officer, Marine Corps Enlisted and Officer Attrition, Inpatient, Medical Evaluation (MED) Board for Navy and Marine Corps, Physical Evaluation Board (PEB) for Navy and Marine Corps, Deaths for Navy and Marine Corps, Marine Corps Addresses by Monitored Command Code/Reporting Unit Code (MCC/RUC), Navy Addresses by UIC, Ports of Call, and Human Immunodeficiency Virus (HIV) Testing. These data files are described in detail in subsequent paragraphs with the file and record layouts shown in Appendix B.

#### 2.2.1 CHAMPS

The CHAMPS database is comprised of variable length records containing data on all Navy enlisted personnel with plans to add Naval officers and Marine Corps officers and enlisted personnel. Each record in the database is variable in length with a fixed section comprising demographic data for a specific member identified by Social Security Number (SSN). The remainder of the record consists of event records which show specific events that occurred during the military service of the member. The event codes that can be recorded for a member are shown in Appendix D. The layouts of the events are shown in Appendix B, listed under the CHAMPS file.

#### 2.2.2 Population Denominator Count File

This file contains the official Navy and United States Marine Corps (USMC) end strengths by quarter for both enlisted and officer personnel. This file will match the official Navy/USMC published personnel publications.

#### 2.2.3 Quarterly Navy Enlisted Active Duty

This data is received quarterly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains the updated status of all Navy

enlisted personnel. Processing of this data cartridge creates the EMR500 data set. Data included in the update are transfers to new units and pay grade changes.

#### 2.2.4 Monthly Navy Enlisted Attrition and Accession

This data is received monthly on magnetic cartridge from NPRDC and contains attrition and accession data on Navy enlisted personnel. Processing of this data cartridge creates the AMON500 data set.

#### 2.2.5 Navy Officer Active Duty

This data is received quarterly on magnetic cartridge from the Defense Information Systems Agency (DISA) and contains data on Navy officer personnel. Processing of this data cartridge creates the NOVER105 data set.

#### 2.2.6 Navy Officer Attrition

This data is received quarterly on magnetic cartridge from NPRDC and contains attrition and accession data on Navy officer personnel. Processing of this data cartridge creates the NOATT105 data set.

#### 2.2.7 Navy Reserve

This data is received quarterly on magnetic cartridge from the Bureau of Naval Personnel (BUPERS) and contains data on personnel in the Naval Reserve. Processing of this data cartridge creates the NRVER105 data set.

#### 2.2.8 Marine Corps Enlisted and Officer

This data is received quarterly on magnetic cartridge from the NPRDC and contains data on officer and enlisted personnel in the Marine Corps. Processing of this data cartridge creates the MCVER105 data set.

### 2.2.9 Marine Corps Enlisted and Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on officer and enlisted personnel in the Marine Corps. Processing of this data cartridge creates the MCATT105 data set.

### 2.2.10 Inpatient

This data is received quarterly on magnetic cartridge from the Naval Medical Data Services Center (NMDSC) and contains data on inpatient hospitalizations for enlisted personnel in the Navy. Processing of this data cartridge creates the INPAT105 data set.

### 2.2.11 Medical Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from the Naval Medical Information Management Center (NMIMC) and contains data on medical boards for personnel in the Navy and Marine Corps. Processing of this data cartridge creates the INPAT105 data set.

### 2.2.12 Physical Evaluation Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on physical evaluation boards for personnel in the Navy and Marine Corps. Processing of this data cartridge creates the PEB105 data set.

### 2.2.13 Deaths for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on deaths for personnel in the Navy and Marine Corps. Processing of this data cartridge creates the DEATH117 data set.

#### 2.2.14 Marine Corps Addresses by MCC/RUC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps. Processing of this data cartridge creates the MCADDR data set.

#### 2.2.15 Navy Addresses by UIC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy. Processing of this data cartridge creates the NAVYADDR data set.

#### 2.2.16 Ports of Call

This data is received quarterly on magnetic cartridge from CNO and contains data on Ports of Call for the Navy. Processing of this data cartridge creates the PORT80 data set.

#### 2.2.17 HIV Testing

This data is received as requested on magnetic cartridge from the Defense Manpower Data Center (DMDC) and contains data on HIV cases for the Navy and Marine Corps. Processing of this data cartridge creates the NEWDMDCPOS data set.

### 2.3 DYNAMIC OUTPUT DATA

The CHAMPS database is the dynamic output file, all data elements can be updated during a normal quarterly update. The record layouts for this file are shown in Appendix B with data elements listed in Appendix C.

## 2.4 DATA CONSTRAINTS

The IBM 4381 mainframe system which is used to process CHAMPS has capacity that is limited only by the number and size of attached disk drives. Currently, there are 3380 disk drives available that have a total combined capacity of 27 gigabytes of storage.

The capacity required for CHAMPS increases by the execution of each update. The updates add new personnel and new rate change, transfer, and hospitalization sub-records. Since this is a historical database, records are not deleted. On-line storage must be sufficient for six million CHAMPS records and associated sub-records

## SECTION 3

### DATA COLLECTION

#### 3.1 REQUIREMENTS AND SCOPE

The CHAMPS database, comprised of the Naval Enlisted Active Duty And Historical Career/Medical Database, contains information on each enlisted member who has been or still is on active duty from January 1, 1965 to the current date. This data base was compiled from the monthly Naval Military Personnel Command (NMPC) change tape extracts dating from January 1, 1965 to June 30, 1973 and the NMPC monthly AMON extract tapes dating from July 1, 1973 to the current date. The medical data were compiled from 4 different data bases supplied by the Naval Medical Data Services Center located at Bethesda, MD. The medical data is composed of inpatient hospitalizations, medical boards, physical evaluation boards, and death records.

These files contain data from 1965 to the current date. The above six data bases have been edited, keeping their data elements constant in contents. This data base has currently 3,255,199 members on it and is updated quarterly. The data base is organized in chronological order by event date and event code. Normally, it will track a member from the date of enlistment to the date of discharge.

The data base is organized as variable length records, with the fixed portion of the record referred to as the demographic record. Within the demographic record each member's demographic elements recorded, such as SSN, name, date of birth.

Following the fixed, or demographic, portion of the record, there can be from one to 200 individual events associated with the member, each related to a specific event affecting the member's service.

### 3.2 INPUT RESPONSIBILITIES

Data received from the various sources is the responsibility of the source, although all data received undergoes extensive editing to ensure only correct data is incorporated. Often, erroneous data is received since some of the data is self reported by the member, or the originator has change the format of the data. When the extensive edits indicate these occurrences, the originator is contacted to clarify or correct the discrepancies.

**APPENDIX E**  
**SUBSECTION A**  
**ACRONYMS AND ABBREVIATIONS**

### ACRONYMS AND ABBREVIATIONS

BUPERS	Bureau of Naval Personnel
CHAMPS	Career History Analytical Medical and Physical Information Open Network
CNO	Chief of Naval Operations
DISA	Defense Information Systems Agency
DMDC	Defense Manpower Data Center
DMED	Defense Medical and Epidemiological Database
DoD	Department of Defense
HIV	Human Immunodeficiency Virus
IBM	International Business Machines Corporation
MCC	Monitored Command Code
MED Board	Medical Evaluation Board
NEC	Navy Enlisted Classification
NHRC	Naval Health Research Center
NMDSC	Naval Medical Data Services Center
NMIMC	Naval Medical Information Management Center
NMPC	Naval Military Personnel Command
NPRDC	Naval Personnel Research Development Center
PEB	Physical Evaluation Board
POC	Point of Contact
RUC	Reporting Unit Code
SIDR	Standard Inpatient Data Record
SSN	Social Security Number
UIC	Unit Identification Code
USMC	United States Marine Corps

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**DATABASE DEFINITIONS**  
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**DATA ELEMENT DICTIONARY**

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**APPENDIX F**

**SYSTEM SPECIFICATION**

**FOR THE NAVY ENLISTED LONGITUDINAL DATABASE**

SYSTEM SPECIFICATION  
for the  
CHAMPS  
(CAREER HISTORY ARCHIVAL  
MEDICAL AND PERSONNEL SYSTEM )  
RESEARCH DATABASE

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## SECTION 1

### GENERAL

#### 1.1 PURPOSE OF THE SYSTEM SPECIFICATION

This System Specification (SS) for the Career History Archival Medical and Personnel System (CHAMPS) Research Database is written to fulfill the following objectives:

- To provide a detailed definition of the system functions,
- To communicate details of the on-going analysis between the user's operational personnel and the appropriate development personnel, and
- To define in detail the interfaces with other systems and subsystems and the facilities to be utilized for accomplishing the interfaces.

#### 1.2 PROJECT REFERENCES

CHAMPS is a computerized medical and personnel database that provides extensive information for Naval medical management for occupational health and epidemiologic research. The system was developed by the Naval Health Research Center (NHRC), San Diego, CA, in association with the Air Force and Army. The mission of the Naval Health Research Center, as assigned by the Secretary of the Navy, and two of the functions to be performed to accomplish the mission, as assigned by the Commander, Naval Medical Command (NHRCINST 5450.1E), are:

To support fleet operational readiness through research, development, testing, and evaluation on the biomedical and psychological aspects of Navy and Marine Corps personnel health and performance, and to perform such other functions or tasks as may be directed by higher authority.

As directed by the Commanding Officer, Naval Medical Research and Development Command, Bethesda, Maryland:

a. Conduct occupational health and safety studies of the Naval service to: identify environmental hazards in the workplace and aboard ship; assess the impact of potentially harmful agents or conditions on health and performance; determine causal factors in illness and accidents; and to develop cost-effective intervention strategies.

b. Maintain data files of medical and service history information for all Naval personnel to: serve as the basis for longitudinal health studies on morbidity, disability, and mortality in relation to demographic, occupational, environmental, psychological, and service history variables; identify health and safety risks to Naval personnel; and to assess the impact of chronic disease on performance and retention.

Pertinent references follow:

a. Documentation for CHAMPS will be in accordance with:

- (1) Life Cycle Management of Automated Information Systems, DoD Directive 7920.1, 17 October 1978;
- (2) DoD Automated Information Systems Documentation Standards Manual, DoD STD 7935A, 31 October 1988; and
- (3) DoD Automated Information System Life Cycle Management Manual, DoD Manual 7920.2M, 1 March 1990.
- (4) *Guidelines For Documentation of Computer Programs and Automated Data Systems.*

b. The following documents were used as references for this SS:

- (1) A Guide to the Computerized Medical Data Resources of the Naval Health Research Center, Report Number 87-13;

### 1.3 TERMS AND ABBREVIATIONS

AIS	Automated Information System
BUMED	Bureau of Medicine. For this document BUMED is a User-ID on the IBM mainframe.
BUPERS	Bureau of Naval Personnel
CHAMPS	Career History Archival Medical and Personnel System
CMS	Conversational Mode System
CNO	Chief of Naval Operations
COBOL	Common Business Oriented Language
DDN	Defense Data Network
DEC	Digital Equipment Corporation
DISA	Defense Information Systems Agency
DMDC	Defense Manpower Data Center
DOB	Date of Birth
DoD	Department of Defense
DOS	Disk Operating System
DRD	Data Requirements Document
DSN	Data Set Name
EMF	Enlisted Master File
EPISYS	Epidemiological Projection Interactive System
IBM	International Business Machines
HIV	Human Immunodeficiency Virus

LAN	Local Area Network
MCC	Monitored Command Code
NHRC	Naval Health Research Center
NMDSC	Naval Medical Data Services Center
NMIMC	Naval Medical Information Management Center
NPRDC	Naval Personnel Research Development Center
PC	Personal Computer
PDC	Population Denominator Count
PEB	Physical Evaluation Board
RUC	Reporting Unit Code
SAS	Statistical Analysis System
SS	System Specification
SSN	Social Security Number
TCP/IP	Transmission Control Protocol/Internetwork Protocol
UIC	Unit Identification Code
USMC	United States Marine Corps
USNR	United States Naval Reserve
VM	Virtual Machine

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## SECTION 2

### SUMMARY OF REQUIREMENTS

#### 2.1 SYSTEM DESCRIPTION

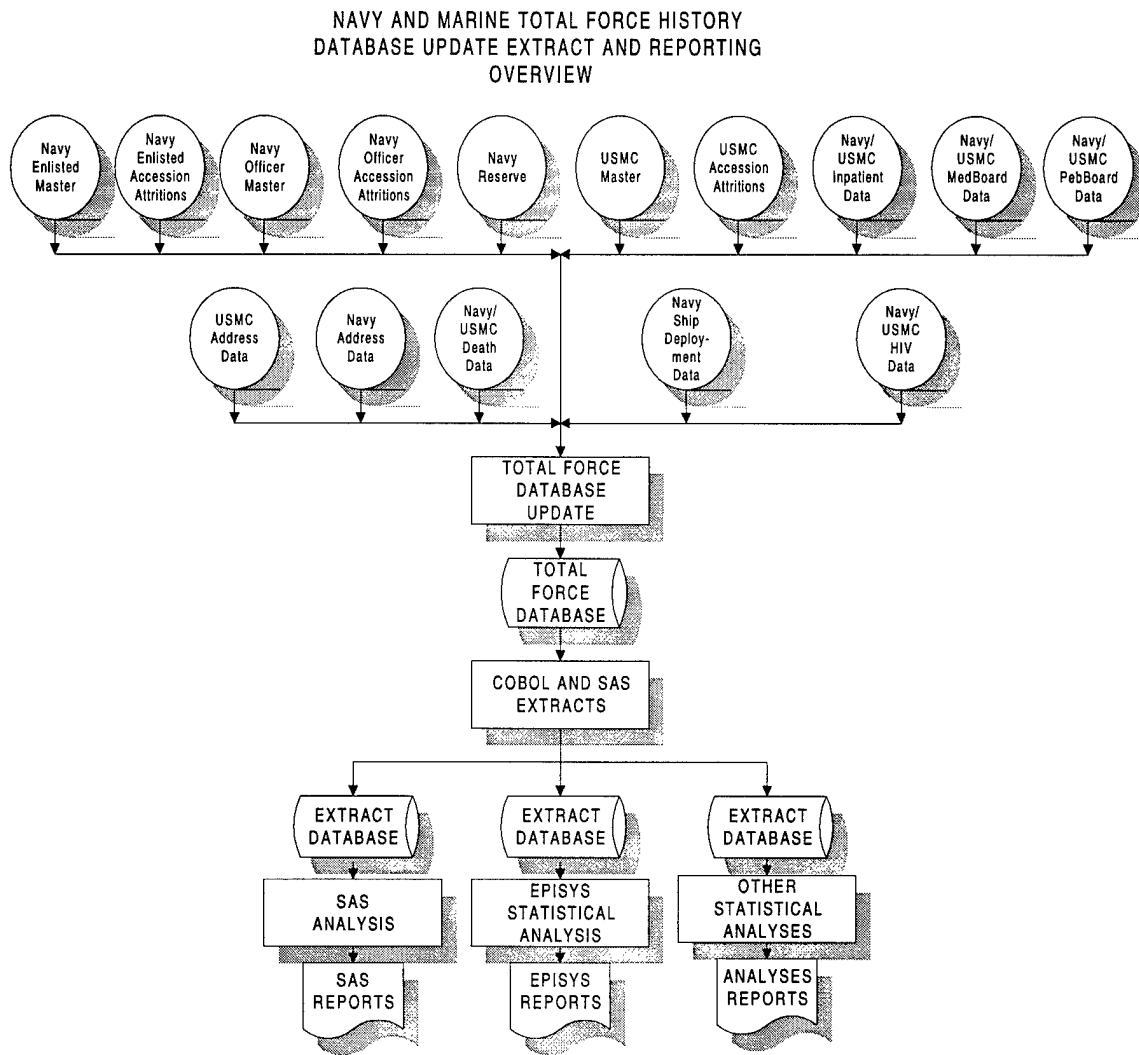
Computerized medical files were first established by NHRC in the late 1960's to investigate the epidemiology of psychiatric disorders. In 1975, the mission of NHRC was broadened from primarily psychiatric research to include the investigation of all types of disease and injury. Research programs in occupational medicine and epidemiology were developed in the late 1970's when it became apparent that these files would have special value for occupational health.

CHAMPS is comprised of one large flat data file which is used to maintain data for longitudinal health studies. This file, the Service History File, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. It is being modified to include data on Navy officer and Marine Corps officer/enlisted personnel. Additionally, the file is being mapped for use by the Army and Air Force. This file is updated from various files received from other organizations, as detailed in Section 4. These files are reformatted into a common record format which is then used to update the master CHAMPS database. In addition, there are supporting data files which are used in conjunction with Service History File for research and analysis. One of these is the Population Denominator Count File. The following paragraphs describe the CHAMPS system and the processes used to update and maintain the data files.

### 2.1.1 CHAMPS System Relationships

Processing of the CHAMPS function at NHRC consists of receiving updated data on cartridges and processing quarterly updates. Prior to the update process, each tape is copied and reformatted into the common format. Figure 2-1 depicts the major data flows coming into CHAMPS.

Figure 2-1 CHAMPS Data Flow Diagram



## 2.2 SYSTEM FUNCTIONS

The functions of CHAMPS include converting data cartridges to the common format, updating the master database, extracting data, and printing reports. CHAMPS supports these functional areas with the following components: Quarterly Navy Enlisted Active Duty Update, Monthly Navy Enlisted Attrition and Accession, Navy Officer Active Duty Update, Navy Officer Attrition, Navy Reserve, Marine Corps Enlisted and Officer, Marine Corps Enlisted and Officer Attrition, Inpatient, MED Board for Navy and Marine Corps, Physical Evaluation Board (PEB) for Navy and Marine Corps, Deaths for Navy and Marine Corps, Marine Corps Addresses by MCC/RUC, Navy Addresses by UIC, and Ports of Call.

All COBOL programs and CMS EXECs are located on CMS minidisk with the User-ID BUMED. The following paragraphs itemize and discuss requirements specific to each of these components.

### 2.2.1 Quarterly Navy Enlisted Active Duty Update

This data, the EMR500, is received quarterly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains the official Navy strengths of Navy enlisted personnel. Data extracted from this file include transfers to new duty stations and changes in pay grade. The process is depicted in Figure 2-2. General information for resolution of discrepancies is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	EMT EXT/S177
<b>Event Codes Created:</b>	501, 502

**Step 1 Copy the input data set and reblock to EMR500 output dataset.**

**NHRC Dataset:** EMR500  
**SAS PROGRAM:** EMRCOPY  
**CMS EXEC:** EMRCOPY  
**Output Dataset:** EMR500

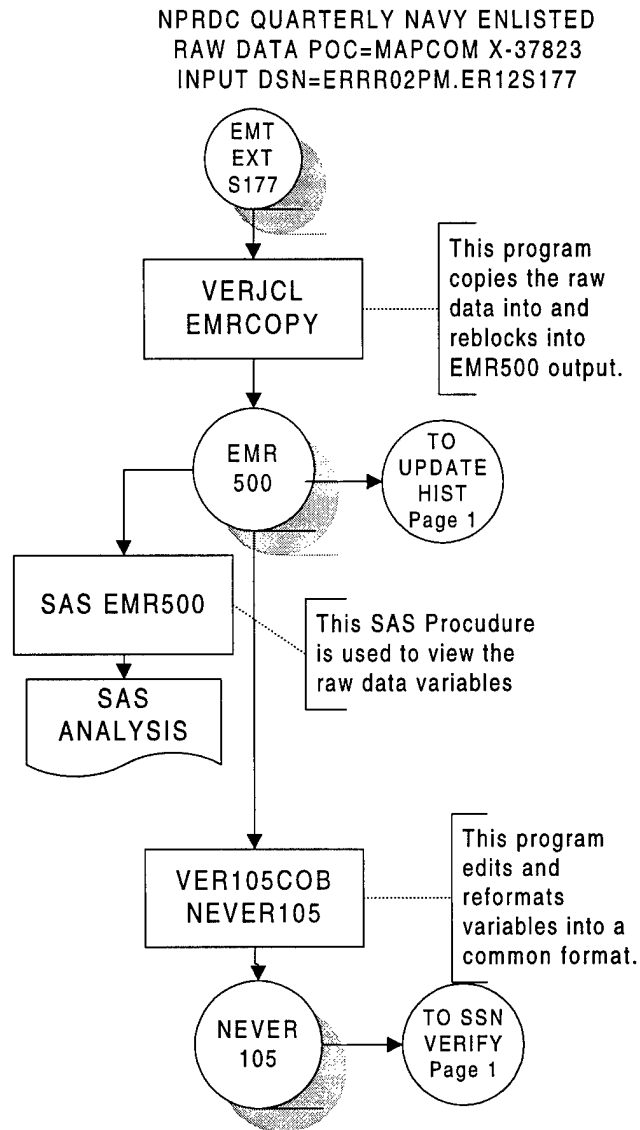
**Step 2 SAS analysis of raw data variables.**

**NHRC Dataset:** EMR500  
**SAS PROGRAM:** EMR500  
**CMS EXEC:** EMR500  
**Output Dataset:** REPORT

**Step 3 Edit and reformat variables into a common record format.**

**NHRC Dataset:** EMR500  
**COBOL PROGRAM:** NEVER105  
**CMS EXEC:** NEVER105  
**Output Dataset:** NEVER105

Figure 2-2 EMR500 Processing Flow



### 2.2.2 Monthly Navy Enlisted Attrition and Accession

This data is received monthly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains attrition and accession data on Navy enlisted personnel. The process is depicted in Figure 2-3. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	AMON/S184
<b>Event Codes Created:</b>	100-199, 301, 328, 344, 381, 382, 383, 384, 385, 386, 387, 388, 389, 391, 801-998

#### **Step 1 Copy the input data set and reblock to AMON500 output dataset.**

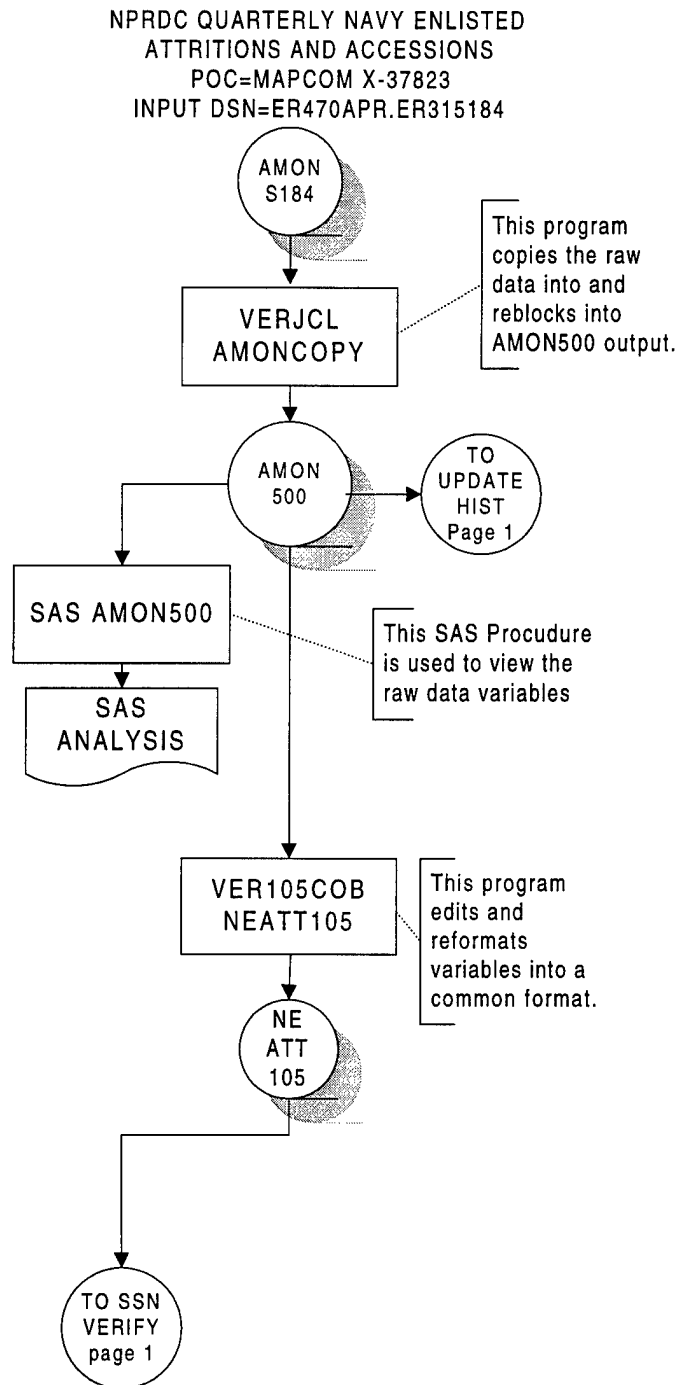
<b>NHRC Dataset:</b>	AMON500
<b>SAS PROGRAM:</b>	AMONCOPY
<b>CMS EXEC:</b>	AMONCOPY
<b>Output Dataset:</b>	AMON500

#### **Step 2 SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	AMON500
<b>SAS PROGRAM:</b>	AMON500
<b>CMS EXEC:</b>	AMON500
<b>Output Dataset:</b>	REPORT

<b>Step 3</b>	<b>NHRC Dataset:</b>	AMON500
	<b>COBOL PROGRAM:</b>	NEATT105
	<b>CMS EXEC:</b>	NEATT105
	<b>Output Dataset:</b>	NEATT105

Figure 2-3 AMON500 Processing Flow



### 2.2.3 Navy Officer Active Duty Update

This data is received quarterly on magnetic cartridge from Defense Information Systems Agency (DISA) and contains data on Navy officer personnel. The process is depicted in Figure 2-4. General information is listed below.

<b>Originator:</b>	DISA/BUPERS/DMC-C
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	OMF HIS S205
<b>Event Codes Created:</b>	501, 502

**Step 1**     **Copy the input data set and reblock to OMR1635 output dataset.**

<b>NHRC Dataset:</b>	ORN524PX.ORPT5205
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPYFILE
<b>Output Dataset:</b>	NO1635

**Step 2**     **SAS analysis of raw data variables.**

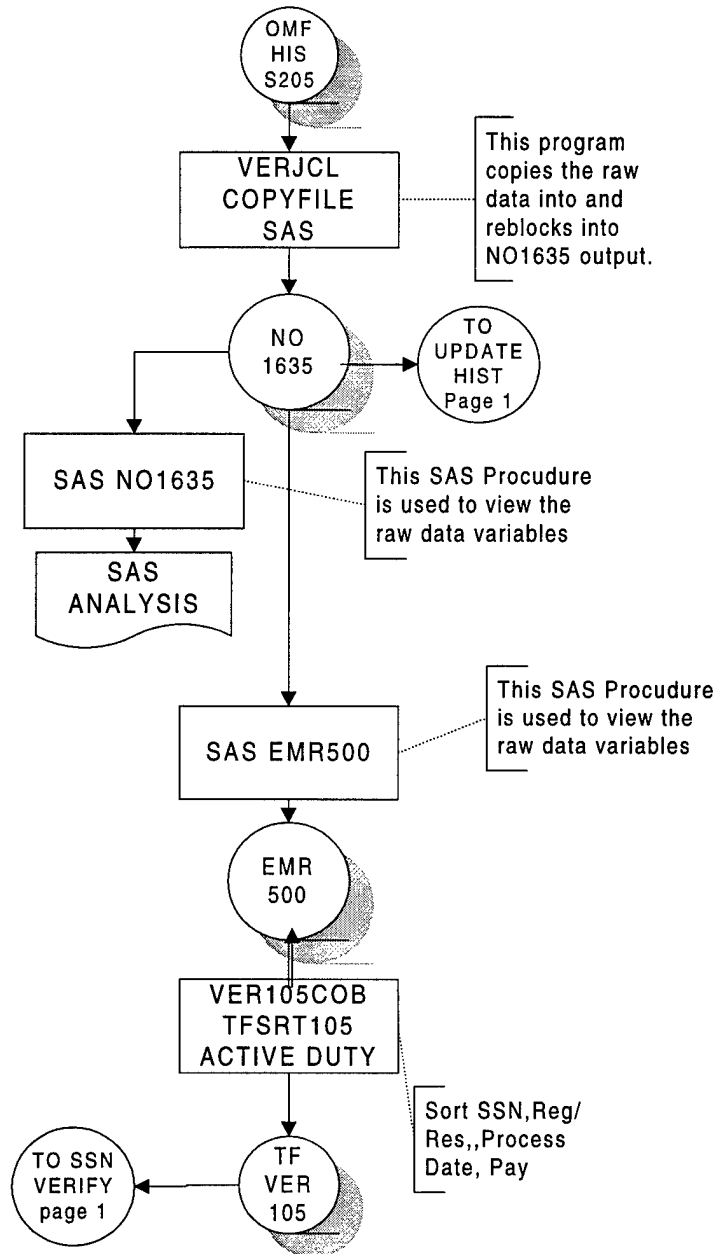
<b>NHRC Dataset:</b>	NO1635
<b>SAS PROGRAM:</b>	NO1635
<b>CMS EXEC:</b>	NO1635
<b>Output Dataset:</b>	REPORT

**Step 3**     **NHRC Dataset:**            NO1635

<b>COBOL PROGRAM:</b>	NOVER105
<b>CMS EXEC:</b>	NOVER105
<b>Output Dataset:</b>	NOVER105

Figure 2-4 NO1635 Processing Flow

DISA QUARTERLY NAVY OFFICER  
RAW DATA POC=MAPCOM X-37823  
INPUT DSN=ORN524PX.ORPT5205



#### 2.2.4 Navy Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on Navy officer personnel. The process is depicted in Figure 2-5. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	OMF ATTR S204
<b>Event Codes Created:</b>	801-998

**Step 1**     **Copy the input data set and reblock to NO1635 output dataset.**

<b>NHRC Dataset:</b>	OMF ATTR S204
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY1635
<b>Output Dataset:</b>	NOATT105

**Step 2**     **SAS analysis of raw data variables.**

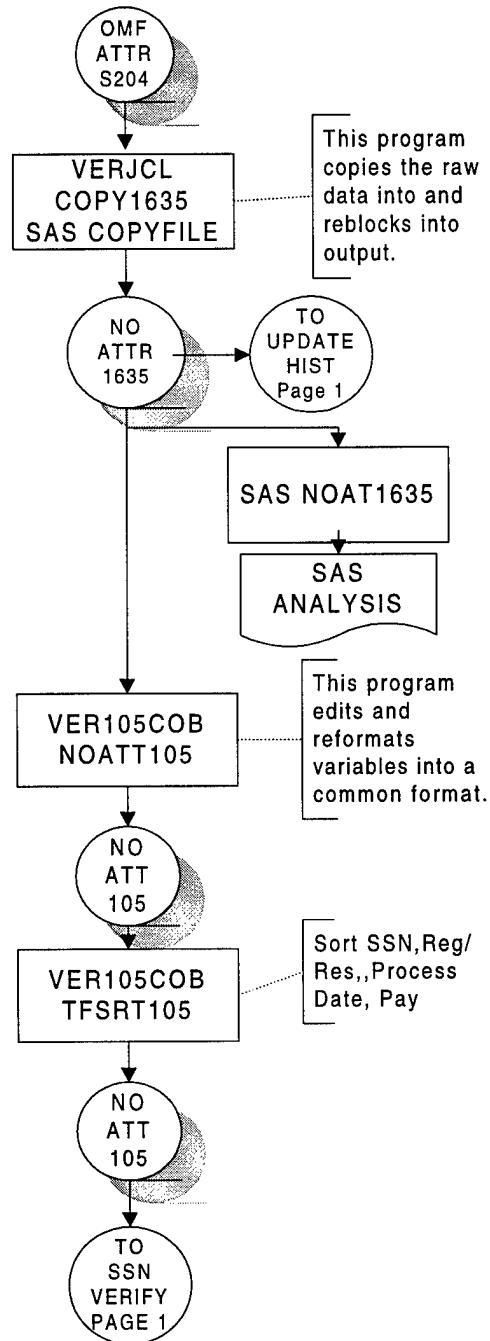
<b>NHRC Dataset:</b>	NOATT1635
<b>SAS PROGRAM:</b>	NOAT1635
<b>CMS EXEC:</b>	NOAT1635
<b>Output Dataset:</b>	REPORT

**Step 3**     **NHRC Dataset:**            NO1635

<b>COBOL PROGRAM:</b>	NOATT105
<b>CMS EXEC:</b>	NOATT105
<b>Output Dataset:</b>	NOATT105

Figure 2-5 NOATT1635 Processing Flow

NPRDC QUARTERLY NAVY OFFICER  
ATTRITION POC=MAPCOM X-37823  
INPUT DSN=ORN523PX.ORPT5204



### 2.2.5 Navy Reserve-BUPERS

This data is received quarterly on magnetic cartridge from the Bureau of Naval Personnel (BUPERS) and contains data on personnel in the Naval Reserve. The process is depicted in Figure 2-6. General information is listed below.

<b>Originator:</b>	BUPERS
<b>Point of Contact:</b>	HELP DESK
<b>Extension:</b>	703-614-5755
<b>Category/DSN:</b>	USNR165
<b>Event Codes Created:</b>	301,344

**Step 1     Copy the input data set and reblock to INRP output dataset.**

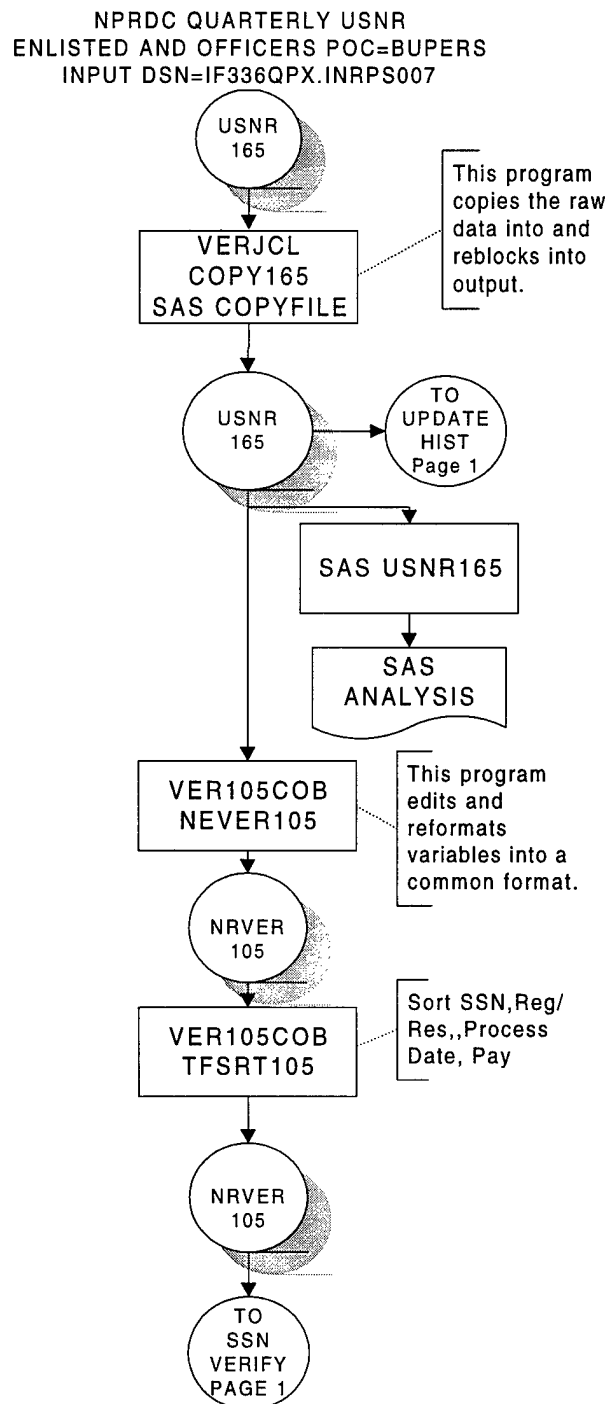
<b>NHRC Dataset:</b>	IF338QPX.INRPS007
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY165
<b>Output Dataset:</b>	USNR165

**Step 2     SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	USNR165
<b>SAS PROGRAM:</b>	USNR165
<b>CMS EXEC:</b>	USNR165
<b>Output Dataset:</b>	REPORT

<b>Step 3     NHRC Dataset:</b>	USNR165
<b>COBOL PROGRAM:</b>	NRVER105
<b>CMS EXEC:</b>	NRVER105
<b>Output Dataset:</b>	NRVER105

Figure 2-6 USNR165 Processing Flow



### 2.2.6 Navy Reserve- DMDC

This data is received quarterly on magnetic cartridge from the Defense Manpower Data Center (DMDC) and contains data on personnel in the Naval Reserve. The process is depicted in Figure 2-7. General information is listed below.

<b>Originator:</b>	DMDC
<b>Point of Contact:</b>	Director of DEERS
<b>Extension:</b>	408-655-0400
<b>Category/DSN:</b>	USNR450
<b>Event Codes Created:</b>	301,344

**Step 1     Copy the input data set and reblock to INRP output dataset.**

<b>NHRC Dataset:</b>	IE065MD4.CP2R210E
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY450
<b>Output Dataset:</b>	USNR450

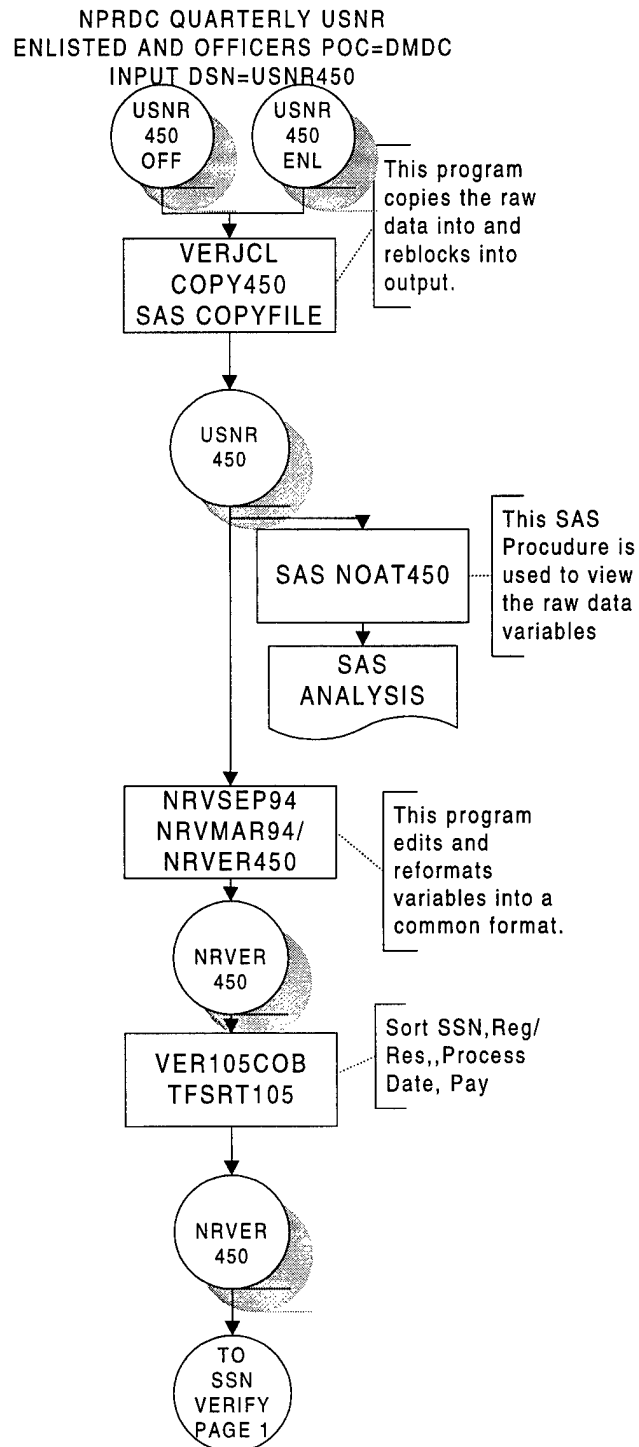
**Step 2     SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	USNR450
<b>SAS PROGRAM:</b>	USNR450
<b>CMS EXEC:</b>	USNR450
<b>Output Dataset:</b>	REPORT

**Step 3**

<b>NHRC Dataset:</b>	USNR450
<b>COBOL PROGRAM:</b>	NRVMAR94
<b>CMS EXEC:</b>	NRVSEP94
<b>Output Dataset:</b>	NRVER450

Figure 2-7 USNR450 Processing Flow



### 2.2.7 Marine Corps Enlisted and Officer

This data is received quarterly on magnetic cartridge from the NPRDC and contains data on officer and enlisted personnel in the Marine Corps. File length has changed in September 1992 from 1200 characters to 1500 characters. In June 1993 the format for the primary dependents changed from positions 671-672 to 681-682. The process is depicted in Figure 2-8. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	MC1500
<b>Event Codes Created:</b>	100-199, 301, 328, 344, 381, 382, 383, 384, 385, 386, 387, 388, 389, 391, 801-998

#### **Step 1    Copy the input data set and reblock to HMF9503 output dataset.**

<b>NHRC Dataset:</b>	HMF9412
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY1500
<b>Output Dataset:</b>	MC1500

#### **Step 2    SAS analysis of raw data variables.**

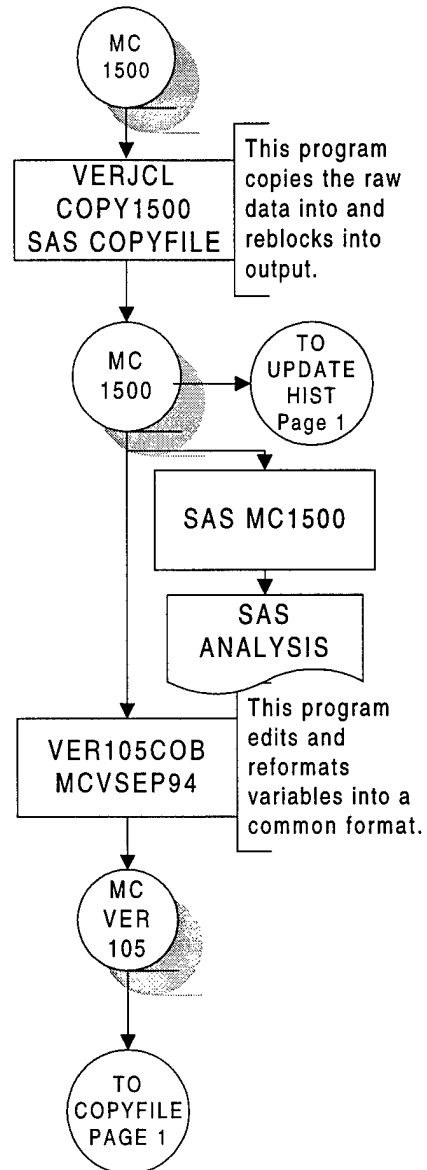
<b>NHRC Dataset:</b>	MC1500
<b>SAS PROGRAM:</b>	MC1500
<b>CMS EXEC:</b>	MC1500
<b>Output Dataset:</b>	REPORT

#### **Step 3    NHRC Dataset:**                      MC1500

**COBOL PROGRAM:** MCVSEP94  
**CMS EXEC:** MCVSEP94  
**Output Dataset:** MCVER105

Figure 2-8 MC1500 Processing Flow

NPRDC QUARTERLY MARINE CORPS  
RAW DATA POC=MAPCOM X-37823  
INPUT DSN=HMF9412



### 2.2.8 Marine Corps Enlisted and Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on officer and enlisted personnel in the Marine Corps. The process is depicted in Figure 2-9. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-7823
<b>Category/DSN:</b>	USMC429
<b>Event Codes Created:</b>	801-999

**Step 1      Copy the input data set and reblock to USMC429 output dataset.**

<b>NHRC Dataset:</b>	USMC429
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY429
<b>Output Dataset:</b>	USMC429

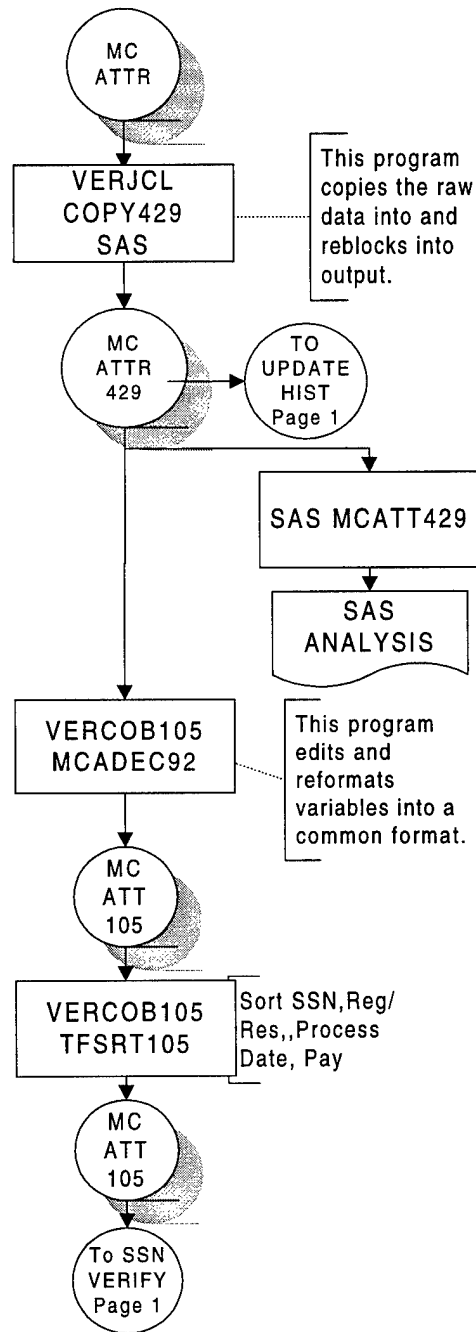
**Step 2      SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	USMC429
<b>SAS PROGRAM:</b>	USMC429
<b>CMS EXEC:</b>	USMC429
<b>Output Dataset:</b>	REPORT

<b>Step 3      NHRC Dataset:</b>	USMC429
<b>COBOL PROGRAM:</b>	MCADEC92
<b>CMS EXEC:</b>	MCADEC92
<b>Output Dataset:</b>	MCATT105

Figure 2-9 MC429 Processing Flow

MARINE CORPS ATTRITION QUARTERLY  
POC=MAPCOM X-37823  
INPUT DSN=USMC429.MAR95.Q1CY95AR



### 2.2.9 Inpatient

This data is received quarterly on magnetic cartridge from the Naval Medical Data Services Center (NMDSC) and contains data on inpatient hospitalizations for enlisted personnel in the Navy. The process is depicted in Figure 2-10. General information is listed below.

<b>Originator:</b>	NMDSC
<b>Point of Contact:</b>	Head, Systems Programming
<b>Extension:</b>	301-295-3264
<b>Category/DSN:</b>	INPAT504
<b>Event Codes Created:</b>	601-608

**Step 1      Copy the input data set and reblock to INPAT504 output dataset.**

<b>NHRC Dataset:</b>	HIP.DHSE.DATA9412
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY504
<b>Output Dataset:</b>	INPAT504

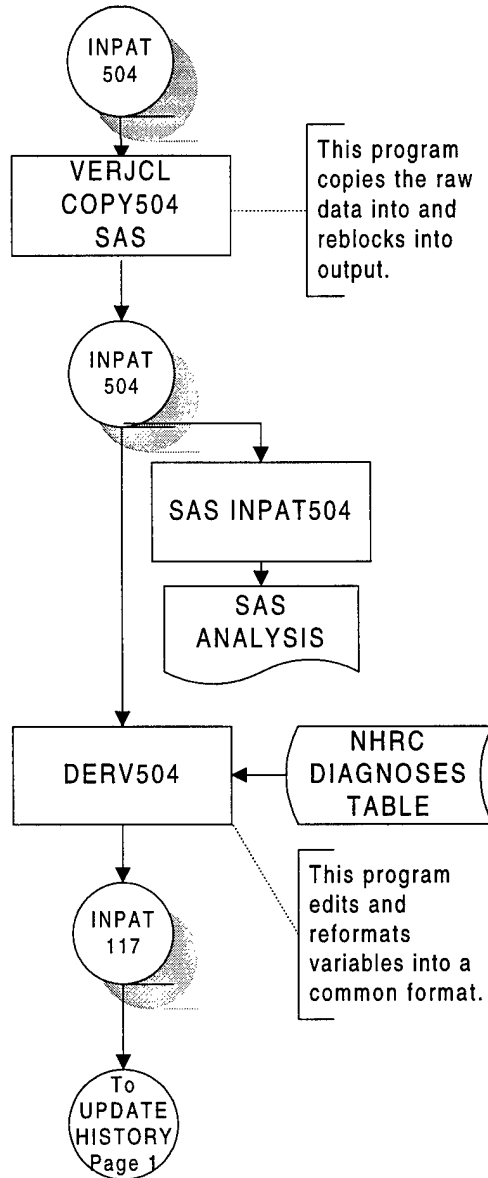
**Step 2      SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	INPAT504
<b>SAS PROGRAM:</b>	INPAT504
<b>CMS EXEC:</b>	INPAT504
<b>Output Dataset:</b>	REPORT

<b>Step 3      NHRC Dataset:</b>	INPAT504
<b>COBOL PROGRAM:</b>	INPAT504
<b>CMS EXEC:</b>	INPAT504
<b>Output Dataset:</b>	INPAT105

Figure 2-10 INPAT504 Processing Flow

USMC/NAVY INPATIENT QUARTERLY  
POC=NMIMC (Bill Jarvis)  
INPUT DSN=HIP.DHSE.DATA9412



### 2.2.10 Medical Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from the Naval Medical Information Management Center (NMIMC) and contains data on medical boards for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-11. General information is listed below.

<b>Originator:</b>	NMIMC
<b>Point of Contact:</b>	Head, Systems Programming
<b>Extension:</b>	301-295-3264
<b>Category/DSN:</b>	MED300
<b>Event Codes Created:</b>	611

#### **Step 1    Copy the input data set and reblock to MED300 output dataset.**

<b>NHRC Dataset:</b>	MED.MBDFILE.MAR93
<b>SAS PROGRAM:</b>	COPY300
<b>CMS EXEC:</b>	COPYFILE
<b>Output Dataset:</b>	MED300

#### **Step 2    SAS analysis of raw data variables.**

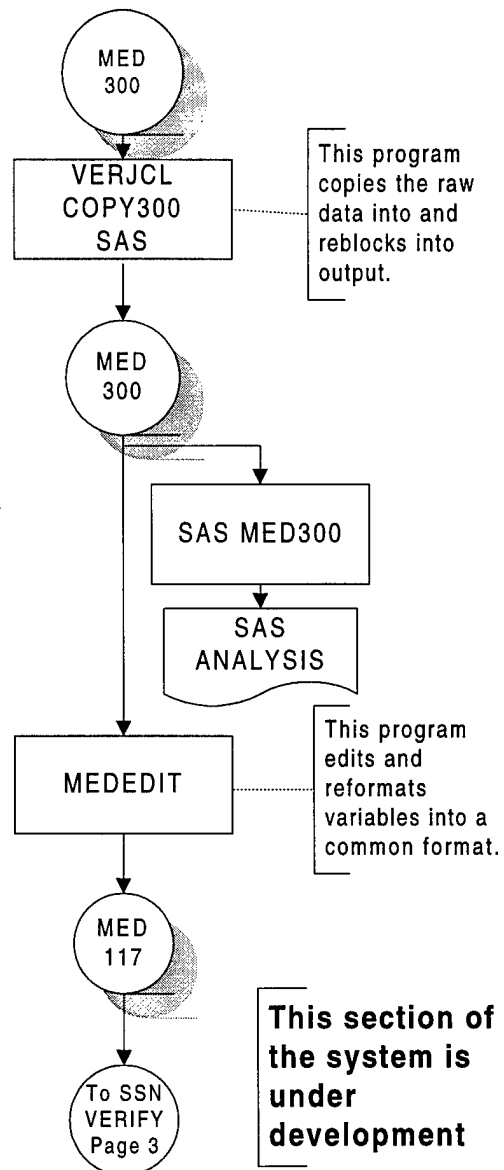
<b>NHRC Dataset:</b>	MED300
<b>SAS PROGRAM:</b>	MED300
<b>CMS EXEC:</b>	MED300
<b>Output Dataset:</b>	REPORT

#### **Step 3    NHRC Dataset:** MED300

<b>COBOL PROGRAM:</b>	MED300
<b>CMS EXEC:</b>	MED300
<b>Output Dataset:</b>	MED117

Figure 2-11 MED300 Processing Flow

MEDBOARD QUARTERLY USMC/NAVY  
RAW DATA POC=NMIMC  
INPUT DSN=MED.MBDFILE.MAR95



### 2.2.11 Physical Evaluation Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on physical evaluation boards for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-12. General information is listed below.

<b>Originator:</b>	NMIMC
<b>Point of Contact:</b>	Head, Systems Programming
<b>Extension:</b>	301-295-3264
<b>Category/DSN:</b>	PEB105
<b>Event Codes Created:</b>	612

**Step 1**     **Copy the input data set and reblock to PEB105 output dataset.**

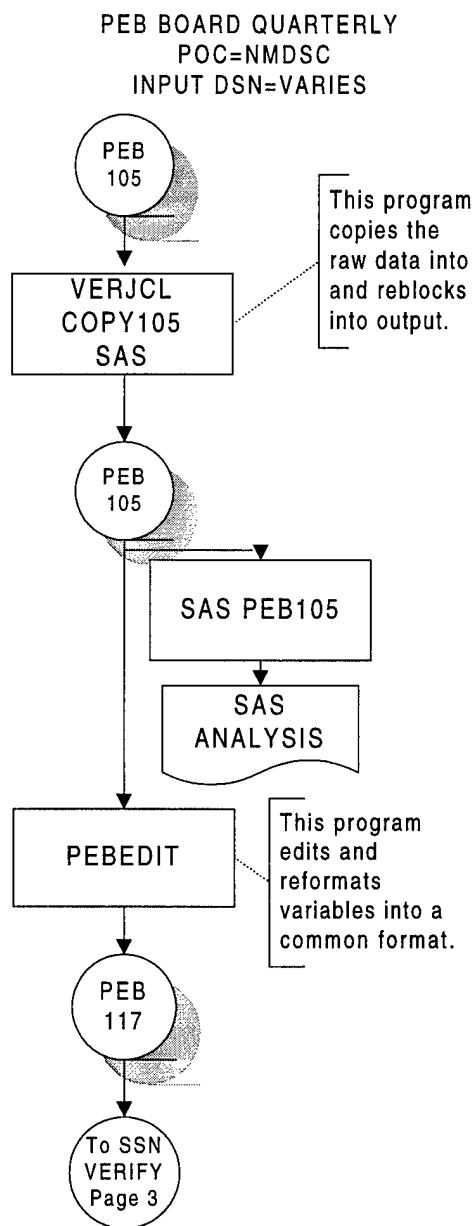
<b>NHRC Dataset:</b>	PEB105
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY105
<b>Output Dataset:</b>	PEB105

**Step 2**     **SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	PEB105
<b>SAS PROGRAM:</b>	PEB105
<b>CMS EXEC:</b>	PEB105
<b>Output Dataset:</b>	REPORT

<b>Step 3</b>	<b>NHRC Dataset:</b>	PEB105
	<b>COBOL PROGRAM:</b>	PEBEDIT
	<b>CMS EXEC:</b>	PEB105
	<b>Output Dataset:</b>	PEB105

Figure 2-12 PEB105 Processing Flow



### 2.2.12 Deaths for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on deaths for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-13. General information is listed below.

<b>Originator:</b>	NMIMC
<b>Point of Contact:</b>	Head, Systems Programming
<b>Extension:</b>	301-295-3264
<b>Category/DSN:</b>	DEATH 93
<b>Event Codes Created:</b>	613

**Step 1**     **Copy the input data set and reblock to filename output dataset.**

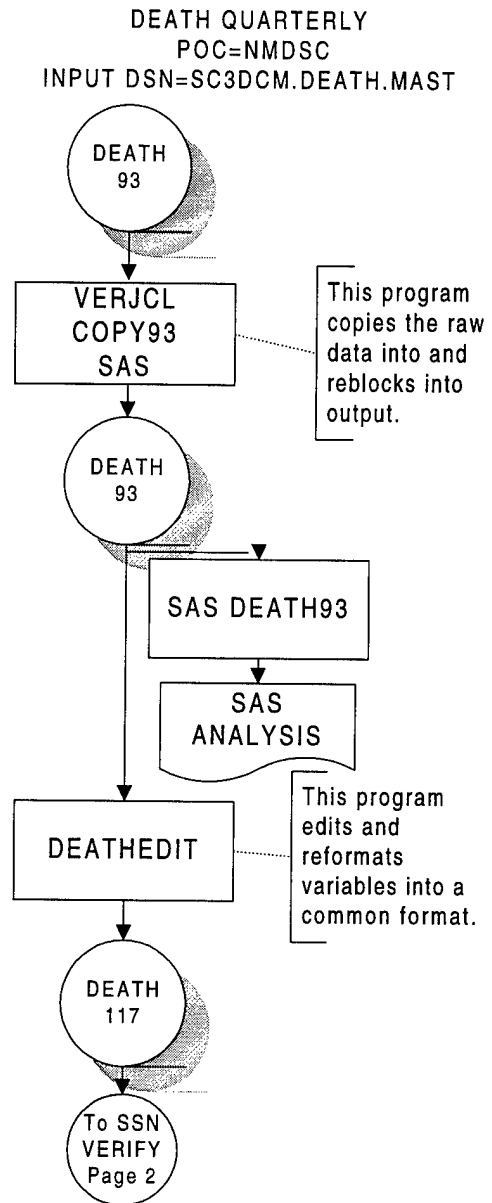
<b>NHRC Dataset:</b>	SC3DCM.DEATH.MAST
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY93
<b>Output Dataset:</b>	DEATH93

**Step 2**     **SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	DEATH93
<b>SAS PROGRAM:</b>	DEATH93
<b>CMS EXEC:</b>	DEATH93
<b>Output Dataset:</b>	REPORT

<b>Step 3</b>	<b>NHRC Dataset:</b>	DEATH93
	<b>COBOL PROGRAM:</b>	DEATHEDIT
	<b>CMS EXEC:</b>	DEATHEDIT
	<b>Output Dataset:</b>	DEATH117

Figure 2-13 DEATH 93 Processing Flow



### 2.2.13 Marine Corps Addresses by MCC/RUC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps. The process is depicted in Figure 2-14. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	553-0538
<b>Category/DSN:</b>	MCADDR
<b>Event Codes Created:</b>	N/A

**Step 1**      **Copy the input data set and reblock to MCADDR output dataset.**

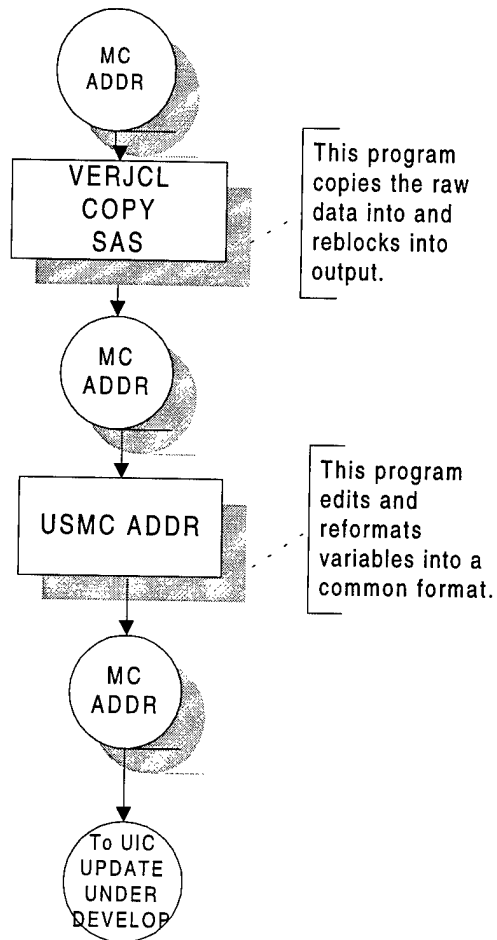
<b>NHRC Dataset:</b>	MCADDR
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPYADDR
<b>Output Dataset:</b>	MCADDR

**Step 2**      **NHRC Dataset:**              MCADDR

<b>COBOL PROGRAM:</b>	USMCADDR
<b>CMS EXEC:</b>	USMCADDR
<b>Output Dataset:</b>	MCADDR

Figure 2-14 Marine Corps Addresses Processing Flow

USMC MCC/RUC ADDRESS QUARTERLY  
RAW DATA POC=NPRDC  
INPUT DSN=VARIES



#### 2.2.14 Navy Addresses by UIC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy. The process is depicted in Figure 2-15. General information is listed below.

<b>Originator:</b>	NPRDC
<b>Point of Contact:</b>	MAPCOM
<b>Extension:</b>	37823
<b>Category/DSN:</b>	NAVYADDR
<b>Event Codes Created:</b>	N/A

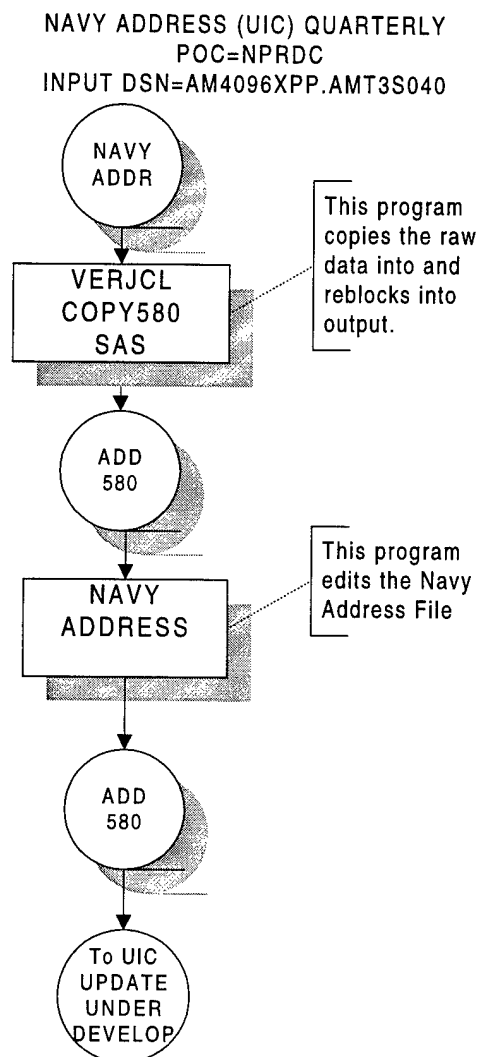
**Step 1**      **Copy the input data set and reblock to NAVYADDR output dataset.**

<b>NHRC Dataset:</b>	NAVYADDR
<b>SAS PROGRAM:</b>	COPYFILE
<b>CMS EXEC:</b>	COPY580
<b>Output Dataset:</b>	NAVYADDR

**Step 2**      **NHRC Dataset:**                      NAVYADDR

<b>COBOL PROGRAM:</b>	NAVYADD
<b>CMS EXEC:</b>	NAVYADD
<b>Output Dataset:</b>	NAVYADDR

Figure 2-15 Navy Addresses Processing Flow



### 2.2.15 Ports of Call

This data is received quarterly on magnetic cartridge from the Chief of Naval Operations (CNO) and contains data on Ports of Call for the Navy. The process is depicted in Figure 2-16. General information is listed below.

<b>Originator:</b>	CNO
<b>Point of Contact:</b>	Naval Investigative Service
<b>Extension:</b>	202-433-8861
<b>Category/DSN:</b>	PORT80
<b>Event Codes Created:</b>	660, 661, 662

**Step 1**     **Copy the input data set and reblock to PORT80 output dataset.**

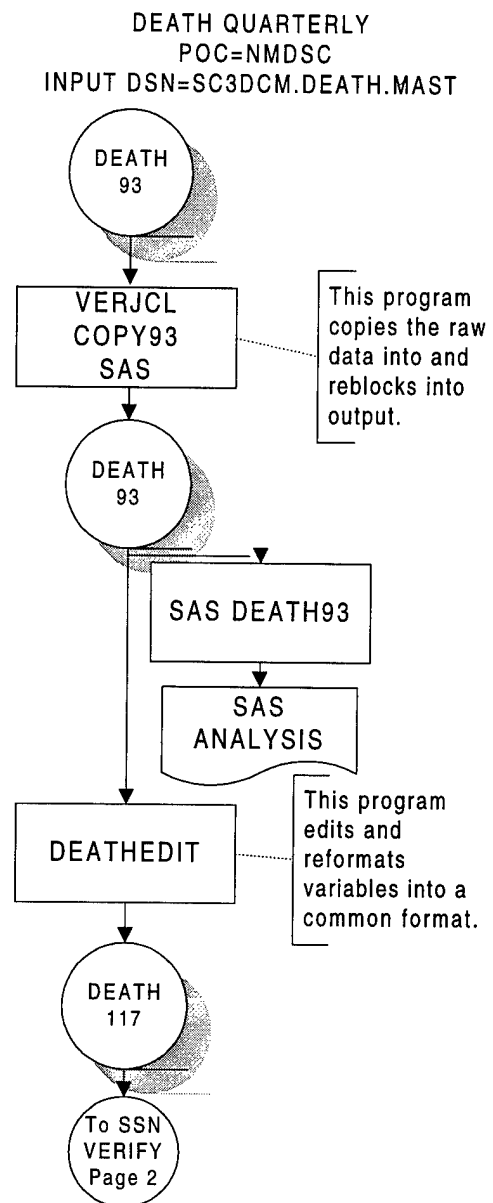
<b>NHRC Dataset:</b>	PORT80
<b>COBOL PROGRAM:</b>	PORTEDIT
<b>CMS EXEC:</b>	PORTEDIT
<b>Output Dataset:</b>	PORT80

**Step 2**     **SAS analysis of raw data variables.**

<b>NHRC Dataset:</b>	PORT80
<b>SAS PROGRAM:</b>	PORT80
<b>CMS EXEC:</b>	PORT80
<b>Output Dataset:</b>	REPORT

<b>Step 3</b>	<b>NHRC Dataset:</b>	PORT80
	<b>PROGRAM:</b>	PORTSORT
	<b>CMS EXEC:</b>	PORTEDIT
	<b>Output Dataset:</b>	PORT80

Figure 2-16 PORTS OF CALL Processing Flow



**2.2.16    HIV46**

This data is received as requested on magnetic cartridges from DMDC and NHRC contain data on Human Immunodeficiency Virus (HIV) cases for the Navy and Marine Corps. The process is depicted in Figure 2-17. General information is listed below.

**Originator:** DMDC  
**Point of Contact:** RDDB  
**Extension:** 408-646-1010  
**Category/DSN:** DMDC46  
**Event Codes Created:** 660-662

**Step 1    Copy the input data set and reblock to DMDC46 output dataset.**

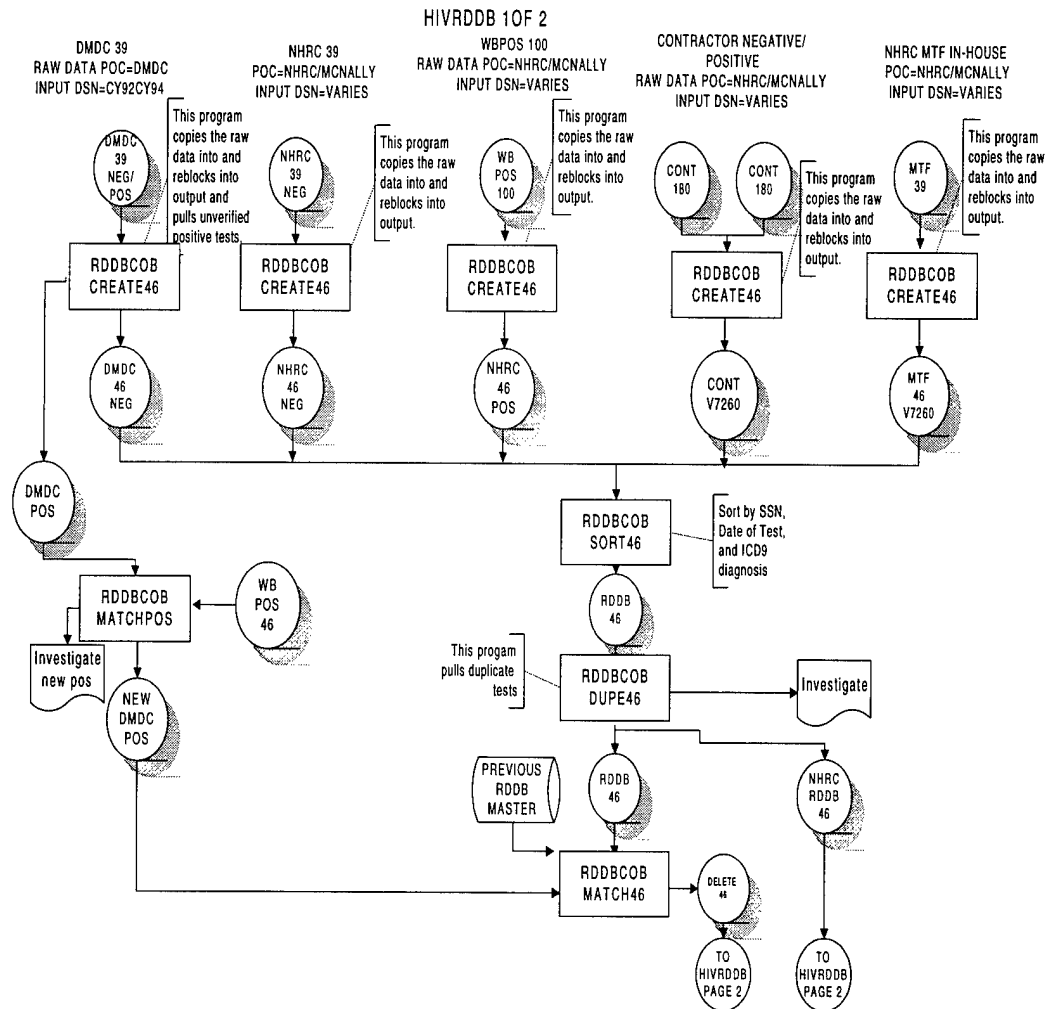
**NHRC Dataset:** DMDC46  
**COBOL PROGRAM:** CREATE46  
**CMS EXEC:** CREATE46  
**Output Datasets:** DMDCPOS, DMDC46 NEG

**Step 2    NHRC Dataset:** DMDCPOS  
**COBOL PROGRAM:** MATCHPOS  
**CMS EXEC:** MATCHPOS  
**Output Dataset:** NEWDMDCPOS

**Step 3    NHRC Datasets:** NHRC46POS,NHRC46NEG,CONTV7250,MTF46  
**COBOL PROGRAM:** DUPE46  
**CMS EXEC:** DUPE46  
**Output Dataset:** RDDB46,NHRC RDDB46

**Step 4**    **NHRC Datasets:**            RDDB46,RDDB MASTER  
             **COBOL PROGRAM:**    MATCH46  
             **CMS EXEC:**            MATCH46  
             **Output Dataset:**      DELETE46

Figure 2-17 HIVRddb Processing Flow



### 2.2.17 Social Security Number Verification

This data file is maintained at NHRC on disk with backup to cartridge. The personnel data from the preceding processes is used as input to update this data file. Common format personnel transactions are generated quarterly to maintain an active Social Security Number verification file. This verification file is utilized to validate personnel data (ie. SSN, date of birth, etc.) with medical transactions input to the system. Figures 2-18 through 2-20 summarize the flow of the verification system.

### 2.2.18 Service History File Maintenance

This data file is maintained at NHRC on disk with backup to cartridge. The medical and personnel data from the preceding processes is used as input to update this data file. Common format transactions from personnel and medical sources are input to update the master file. Figures 2-21 through 2-23 demonstrates the history update system flow.

### 2.2.19 Population Denominator Count File

The Population Denominator Count (PDC) file contains annual population counts for the entire enlisted population. The file is in a condensed format and is stored on disk to allow rapid access to Navy population data from 1974 to the present. Annual population counts are determined by summing five quarterly counts for each calendar year (31 December of the preceding year and 31 March, 30 June, 30 September, and 31 December of the year of interest) and dividing this sum by 5 to estimate the population at risk for the given year. Such denominators are needed for the calculation of disease incidence rates by age, sex, race, length of service, occupation, or combinations such as age-specific rates by occupation. The PDC file is derived from the Enlisted Master File (EMF) supplied by the Navy Military Personnel Command. The EMF contains personnel and service history data members. An extract is copied from the EMF quarterly and this extract provides counts of Navy enlisted personnel broken down by the most frequently

used demographic and service history variables and combinations of these. The variables represented in the PDC file and their categories are as follows:

- Age 17 through 60 by single years, 61 and over grouped
- Race Caucasian, Black, oriental, American Indian, Malaysian, Not Recorded
- Sex Male, female
- Paygrade E1 through E9
- Education <8 grouped, 9 through 20 by single years
- Length of service 1 through 30 by single years, 31 and over grouped
- Rate (occupation) All Navy occupations, approximately 110
- Rate group Eleven rate groups
- Activity Six grouped activities

Specific population counts available from the Population Denominator Count (PDC) File are:

- Age-, race-, sex-specific counts by occupation or paygrade or length of service or education.
- Occupation-, race-, sex-specific counts by length of service or paygrade.
- Activity, race-, sex-specific counts by rate group, or paygrade, or length of service.

Quarterly or annual counts reflecting the specific subpopulations of interest are stored on disk and are immediately retrievable. An example of a frequently used combination would be age distributions within occupational specialties for male Caucasian members to compute age-specific hospitalization rates by occupation, sex, and race. Other examples might be black Boiler Technicians aboard destroyers who have less than three years of service or female Hospital Corpsman who have some college education and are pay grade E-6 or above. This file can be used to determine number of individuals, or more commonly, person-years at risk during a specified time period.

Figure 2-18 SSN Verification Processing Flow (Chart 1)

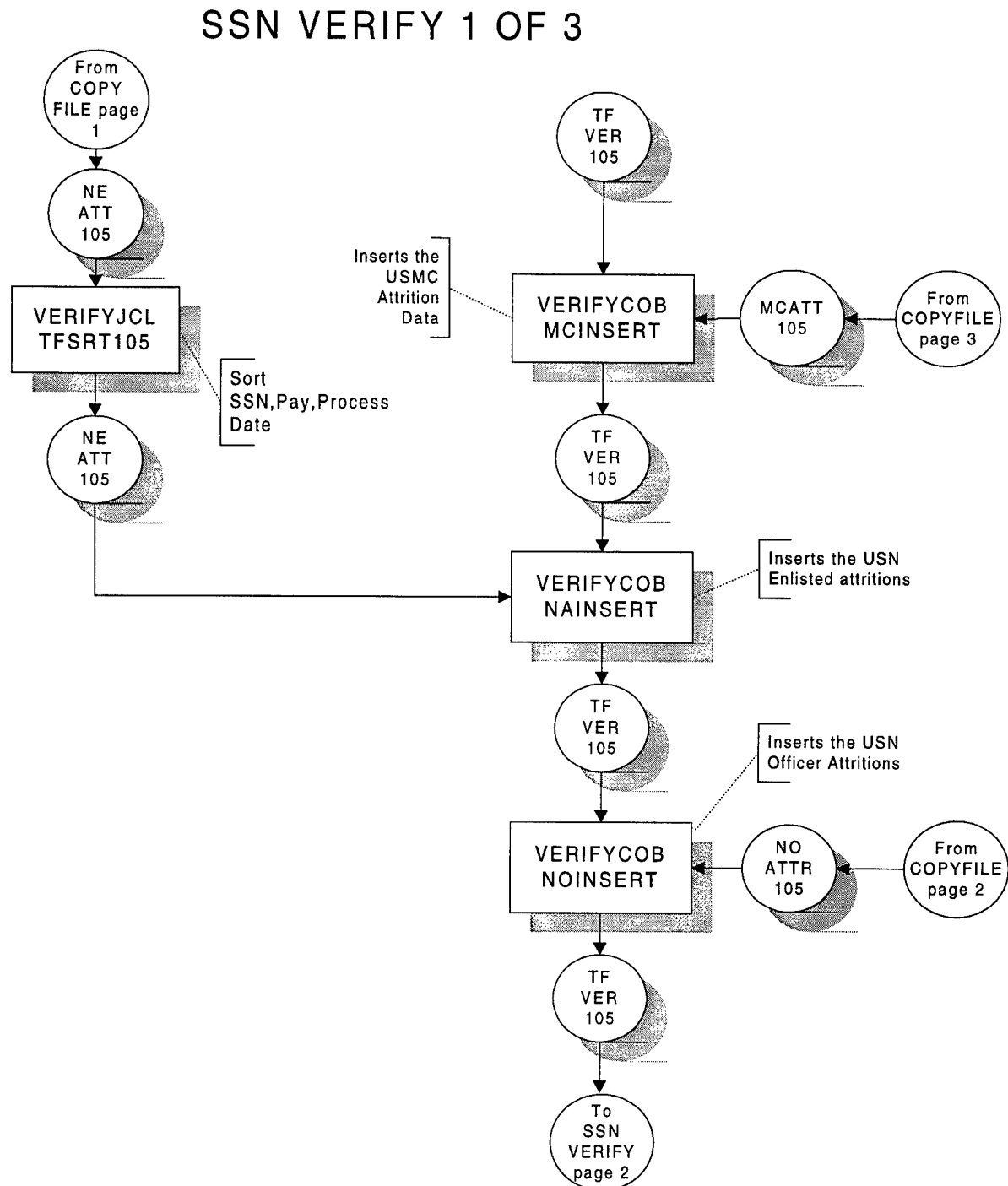


Figure 2-19 SSN Verification Processing Flow (Chart 2)

## SSN VERIFY 2 OF 3

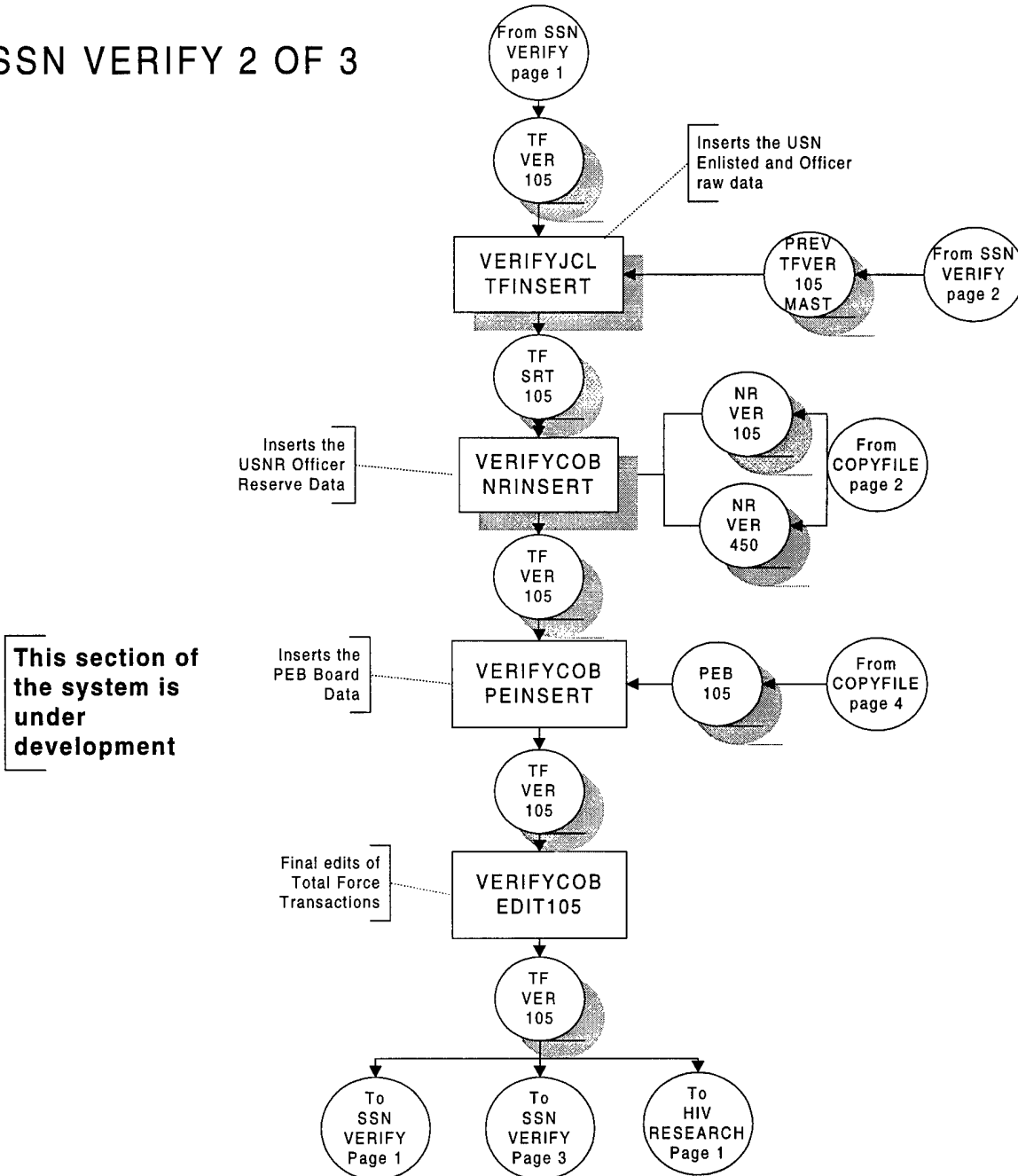


Figure 2-20 SSN Verification Processing Flow (Chart 3)

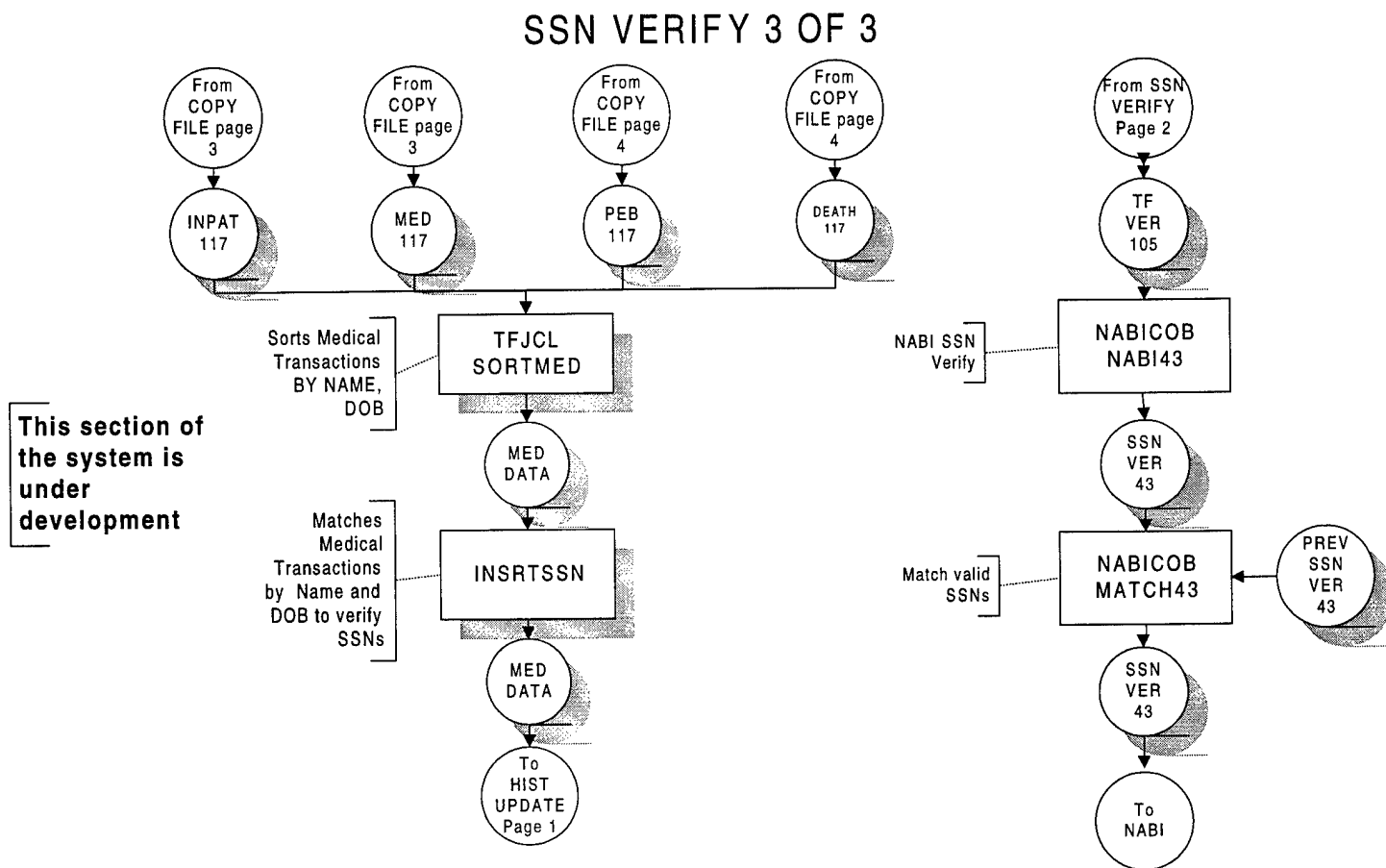


Figure 2-21 Update Processing Flow (Chart 1)

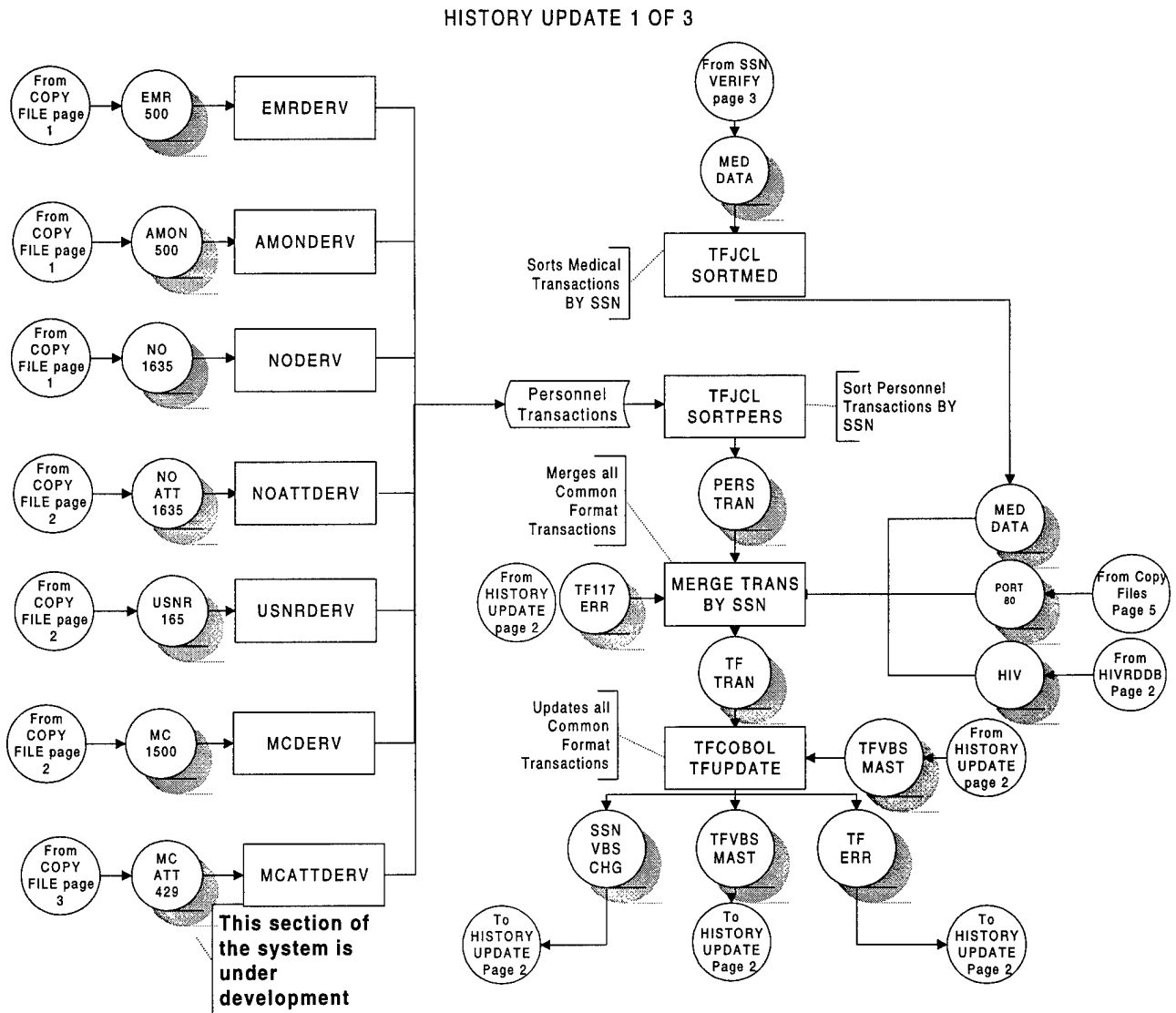


Figure 2-22 Update Processing Flow (Chart 2)

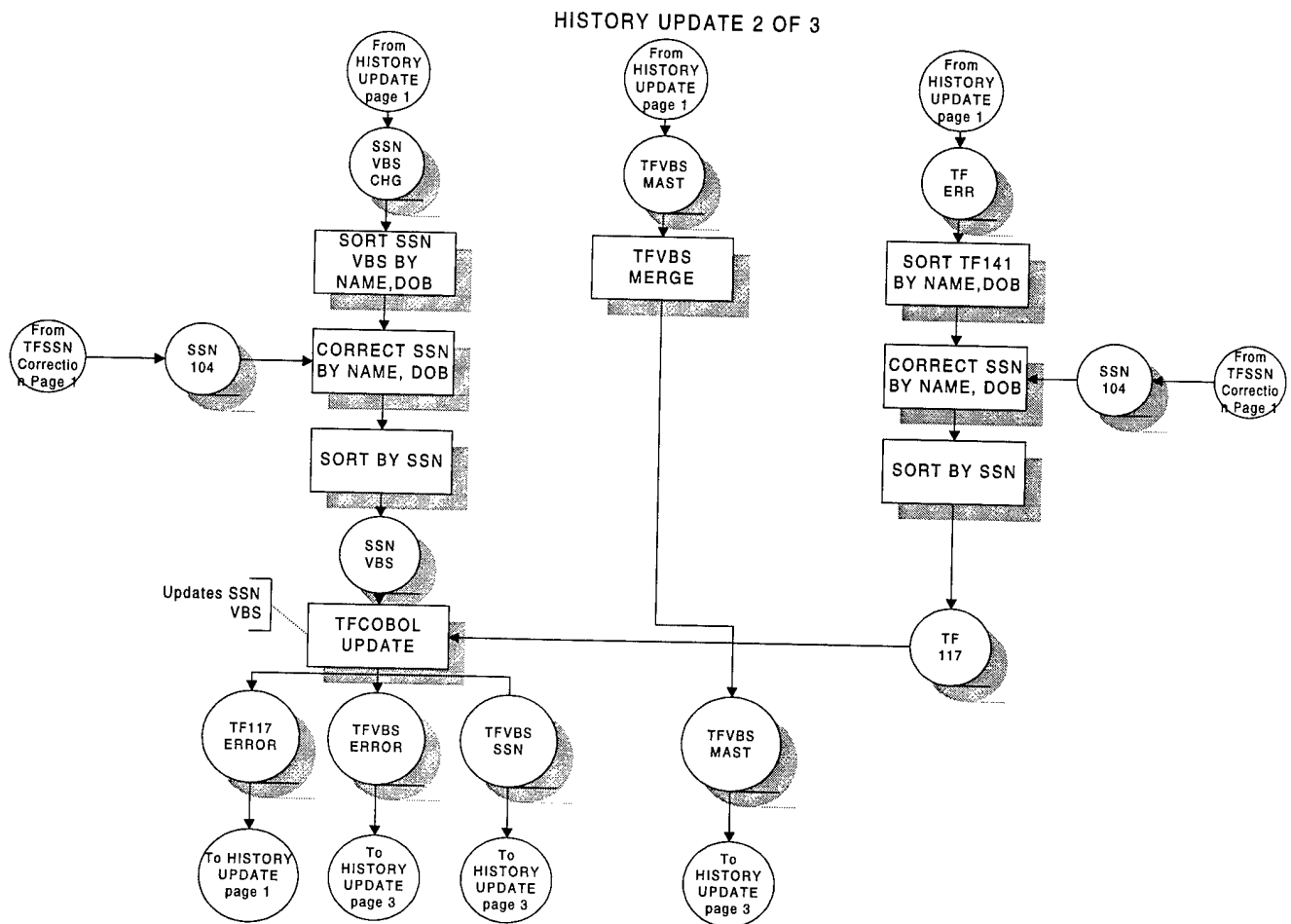
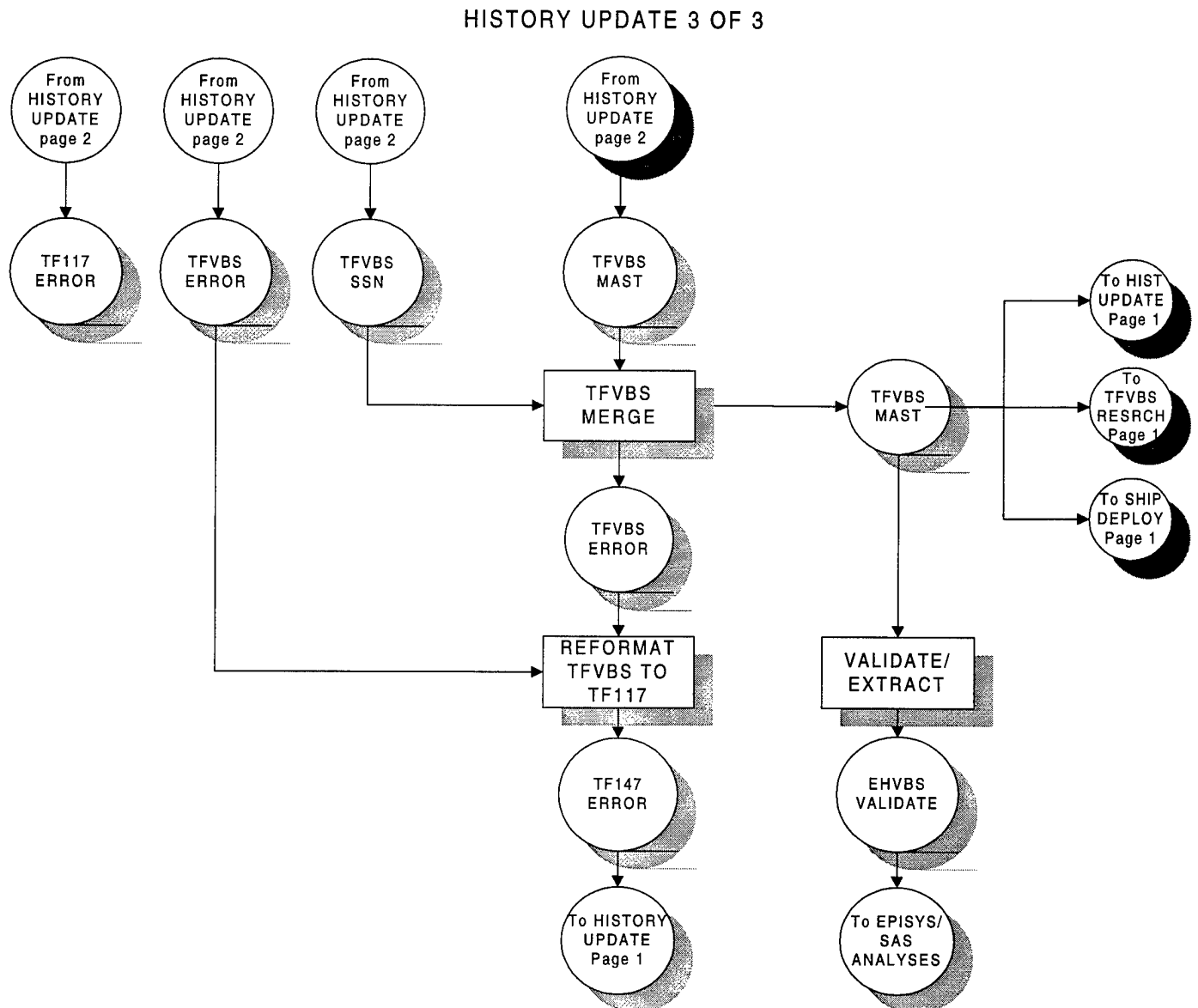


Figure 2-23 Update Processing Flow (Chart 3)



### 2.2.20 Accuracy and Validity

The logical accuracy and validity of data entering the CHAMPS system is accomplished via automated or manual processes, as detailed below:

a. CHAMPS Update Process. Updating the CHAMPS database is accomplished quarterly. To ensure accuracy and validity of the data for the updates specific validation and verifications are performed. Among these are the following:

- Machine edits and validations are performed automatically by the system upon entry of all data by verifying data against on-line edit tables, bypassing invalid data before update of system records.
- Control features have been developed to ensure that all related records remain in balance with each other and that each transaction updates all required records.
- Document control procedures have been developed to ensure that all input was, in fact, processed and that hard copy documentation is available for audit purposes.

b. Daily Scheduled Output. Daily CHAMPS products are available to users as required.

c. Daily Nonscheduled Output. Nonscheduled CHAMPS products based on terminal operators' requests are accepted on demand; however, delivery may be delayed depending on system usage and product size.

## 2.3 FLEXIBILITY

Due to the current size of the database and the existing quantity of programs developed to support and maintain the database, CHAMPS is not readily subject to change without a major design and development effort.

### 2.3.1 Capacity Limits

The International Business Machines (IBM) 4381 mainframe system used to process CHAMPS has capacity limited only by number and size of attached disk drives. Currently, there are 3380 disk drives available that have a total combined capacity of 27 gigabytes of storage.

The capacity required for CHAMPS increases by the execution of each update. The updates add new personnel and new rate change, transfer, and hospitalization event records. Since this is a historical database, records are not deleted. On-line storage must be sufficient for TBD CHAMPS records and associated sub-records

## 2.4 FALLBACK

Fallback is defined as the procedures necessary to ensure continuity of operation when all backup systems have failed. At the local site, fallback is accomplished by reloading CHAMPS databases and software onto an IBM mainframe from system backup tapes.

In the case of a catastrophic event at the NHRC, such as a flood or fire, the CHAMPS system will not come to a crashing halt. Sufficient back-up files and procedures are in place to minimize the risk of catastrophic events.

## 2.5 FAILURE CONTINGENCIES

Failure contingencies for CHAMPS are developed to include the restoration of programs and data on IBM type mainframe system.

### **SECTION 3**

### **ENVIRONMENT**

#### **3.1 AIS EQUIPMENT ENVIRONMENT**

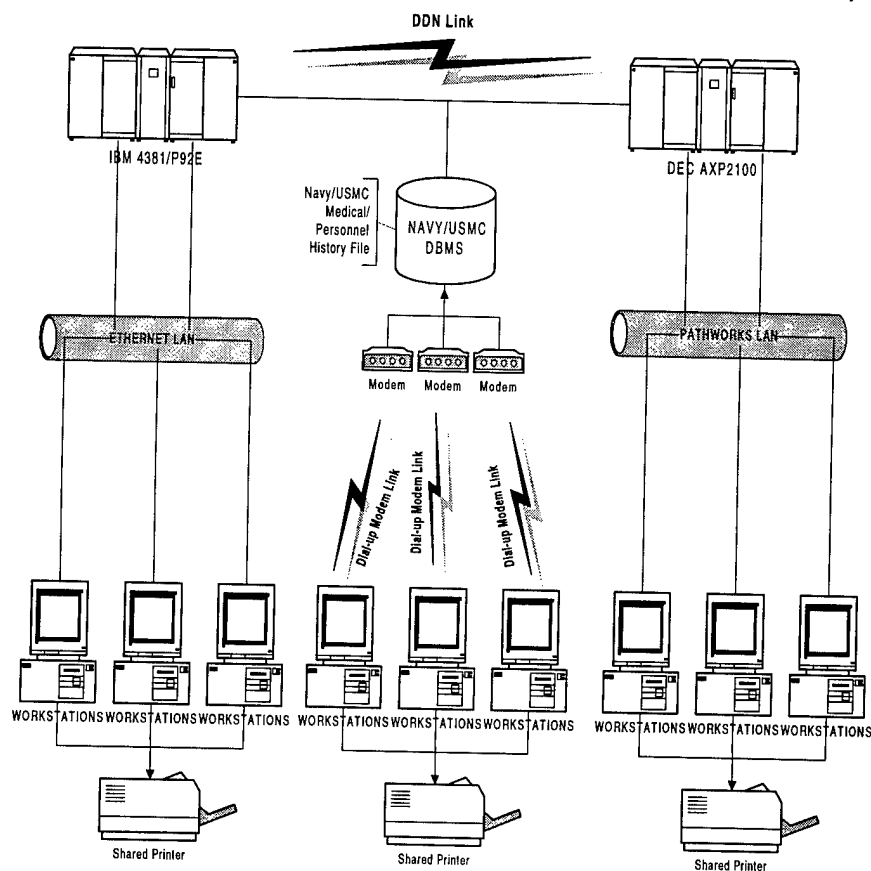
Located in building 330 is a dual processor IBM 4381 model P92E mainframe computer which has tape, cartridge, and disk drive storage. The internal storage of the computer is 32 megabytes running the VM/SP operating system.

#### **3.2 COMMUNICATIONS ENVIRONMENT**

The data communications environment of the system is shown below in Figure 3.1. The primary means of linking is via dial-up modems from Personal Computer (PC) workstations. The connection is presently 14.4 Kbps modems to either the IBM 4381 or the Digital Equipment Corporation (DEC) AXP2100 which are linked via the Defense Data Network (DDN).

Figure 3-1 Data Communications Environment

**THE CHAMPIONS RESEARCH DATABASE NETWORK**  
Career History Analytical Medical and Physical Information Open Network System



### 3.2.1 Network Description

The DEC Platform utilizes Pathworks Protocol for its LAN connectivity. External connections are made via DDN and the Internet. The purpose of the network is to facilitate access to all internal and external users via local area and wide area networks. Interfaces are described in the following:

a. Mainframe computers are connected via DDN to each other, while modem and local area network are used to connect to workstations and terminals as shown above.

b. The configuration utilizes dial-up and dedicated connections. The local area network is generally ethernet bus using Pathworks protocol.

c. Transmission technique is baseband on the local area networks and broadband for the wide area network.

d. Data transfer rates are limited by the modem speed for the dial-up users. The local area network users' transfer rate is ten megabits per second on the ethernet.

e. The gateway to the outside is via widearea network DDN and the Internet.

f. Geographic locations are generally on the West Coast with connectivity on DDN throughout the world.

g. CHAMPS uses the dial-up, local area, and wide area networks generally during business hours.

### 3.2.2 Physical Interface

The physical interface of the communications portion of CHAMPS is described below:

- a. Line speed capability for the dial-up users is 14.4 Kbps. The dedicated local area network users run at ten megabits per second.
- b. The electrical interface on the workstations is through standard RS232.
- c. Hardware requirements are minimal. Dial-up links are achieved with modem and switched line interface. The dedicated local area network links are via standard ethernet hardware. Mainframe network hardware uses telecommunications controllers.
- d. Transmission requirements are through high-speed lines both switched and dedicated.

### 3.2.3 Protocol Interface

The protocol interface is Pathworks for the DEC local area network. The wide area network protocol is Transmission Control Protocol/Internet Protocol (TCP/IP) on the DDN.

### 3.2.4 Applications User Interface

The application runs on the IBM mainframe. The primary interface to users is via dial-up modems and local area networks. There is also a DDN link to the outside wide area network.

### 3.2.5 Diagnostics

Users can identify communications problems through a customer support specialist. Diagnostic tools are available to the specialist to quickly pinpoint the source of the problem. Field service personnel are on-call when the problem is not resolved within a reasonable period.

## 3.3 SUPPORT SOFTWARE ENVIRONMENT

The operating system used on the AIS is IBM's Virtual Machine (VM) with Conversational Mode System (CMS). All programs are maintained in disk libraries using CMS. The programs are compiled with COBOL and executed using the CMS EXEC.

## 3.4 SOFTWARE INTERFACES

The software interfaces are primarily COBOL and SAS programs. The customized statistical package, EPISYS, resides on a personal computer and is written in C++. The database files are extracted and downloaded to the PC for analysis.

EPISYS is an acronym for the Navy's prototype Epidemiological Projection Interactive System. EPISYS is a PC-based, user-friendly interface system that calculates person-year-based first hospitalization rates from data available in the Enlisted History. EPISYS contains arrays of counts of cases and population denominators, rather than entire individual records. This allows a user of EPISYS to rapidly access incidence data, perform age-adjustment, and display trends for all ICD-9 categories. Currently, EPISYS produces counts and incidence rates for Navy enlisted personnel only. Drawing on a common data architecture, it could be expanded to include Navy officers, Marine Corps personnel, and it could be used by other services. It is designed to run on standard IBM 486 PC equipment under a DOS/WINDOWS environment, and has user-friendly menus for selection of variables and tabular and graphical displays.

Preliminary assessment of data resource availability and file structures indicate that inclusion of Navy Officers and Marine Corps personnel into the Enlisted History could be accomplished during the time frame of this project. Preliminary assessment indicates that the Enlisted History format with a variable length record data architecture can be adapted for use by other services, subject to the availability of data resources. Using the Enlisted History data architecture as a prototype, each service could develop hospitalization and other health event rate analyses using its own data.

The current front-end statistical analysis system can have some differences when comparing frequency counts. When EPISYS is run on the PC using Enlisted History Validation file, it counts the first (primary) diagnosis (601 record) for all hospitalizations. (For example: if a person has three hospitalizations with the same primary diagnosis, then the frequency count would be three). A SAS analysis on the Enlisted History file may not only count the first diagnosis for a hospitalization, but also secondary diagnoses as well, including Medical and Physical Evaluation Board rulings.

### 3.5 SECURITY

The IBM mainframe that hosts the application utilizes standard VM/CMS protection of data and user IDs.

## SECTION 4

### DESIGN DETAILS

#### 4.1 GENERAL OPERATING PROCEDURES

This paragraph describes the operating procedures for CHAMPS and will include some of the following paragraphs. The standard operation schedule is run as a batch process quarterly depending on the arrival of input sources. The input normally arrives on tape cartridge and is copied for backup. Raw input data is analyzed with SAS procedures prior to processing. Database extracts and reports are normally performed on an adhoc basis. The database is backed up quarterly.

#### 4.2 SYSTEM LOGICAL FLOW

This section describes the general framework and design for CHAMPS. It provides a generic discussion of a typical processing module and follows the flow of a transaction from the users initial input to produced output.

##### 4.2.1 Major Components

a. Overall. VM/CMS is used for access to the system and for overall processing control, such as job submission and execution.

#### 4.3 SYSTEM DATA

This paragraph describes inputs, outputs and databases of the system. Record descriptions and data element descriptions are described in detail in the CHAMPS Data Requirements Document.

##### 4.3.1 Inputs

The data used as input from external sources are listed here.

4.3.1.1 EMR500 Quarterly Navy Enlisted. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.2 AMON500 Monthly Navy Enlisted Attrition and Accession. The file is also received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.3 NO1635 Navy Officer. Strength file, active duty. The file is received quarterly on cartridge from DISA and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.4 NO1635 Navy Officer. Accession, attrition, and discharge personnel file. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.5 INRP Navy Reserve. USNR165 comes from Naval Reserve Command, New Orleans and USNR450 comes from Defense Manpower Data Center, Monterey, CA. The file is received quarterly on cartridge and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.6 HMF9503 Marine Corps Enlisted and Officer. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record

layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.7 USMC429 Marine Corps Attrition Enlisted and Officer. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.8 INPAT504 Inpatient. The file is received quarterly on cartridge from NMIMC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.9 MED300 MED Board. The file is received quarterly on cartridge from NMIMC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.10 PEB - Physical Evaluation Board. The file is received quarterly on cartridge from NMIMC and processed through the update process. Under the new Medical Board tracking system, Physical Evaluation Board (PEB) data will be integrated with the Med Board data. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.11 DEATH94 Death USMC/NAVY. The file is received quarterly on cartridge from NMDSC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.12 USMC Address (MCC/RUC). The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.13 ADD580 Navy Address (UIC). The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.14 Ports of Call. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.15 DMDC39. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

#### 4.3.2 Outputs

Outputs from CHAMPS consist of data extracts for use by research personnel. The extracts are created as required when requests for data are received from the researchers. The extracts are then analyzed using SAS routines by the researchers.

#### 4.3.3 Database/Data Bank

Database descriptions are presented in the following paragraphs.

4.3.3.1 Service History File. This data file is maintained at NHRC on disk with backup to cartridge. The data from the preceding processes is used as input to update this data file. This file contains data collected from fleet and navy hospitals for inpatient hospitalizations. This includes data from medical boards, physical evaluation boards, and the official Navy death record system. Demographic data is also maintained via quarterly updates.

The Service History File, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. It is being modified to include data on Navy officer and Marine Corps officer/enlisted personnel. Additionally, the file is being mapped for use by the Army and Air Force. This file is updated from various files received from other organizations. These files are reformatted into a common record format which is then used to update the master Service History File. In addition, there are supporting data files which are used in conjunction with Service History File for research and analysis. One of these is the Population Denominator Count File. The following paragraphs describe CHAMPS and the processes used to update and maintain the data files.

4.3.3.2 Population Denominator Count File. This file contains the official Navy/Marine Corps end strengths by quarter for both enlisted and officer. These files will match the official Navy/United States Marine Corps (USMC) published personnel publications.

The Population Denominator Count (PDC) file contains annual population counts for the entire enlisted population. The file is in a condensed format and is stored on disk to allow rapid access to Navy population data from 1974 to the present. Annual population counts are determined by summing five quarterly counts for each calendar year (31 December of the preceding year and 31 March, 30 June, 30 September, and 31

December of the year of interest) and dividing this sum by 5 to estimate the population at risk for the given year. Such denominators are needed for the calculation of disease incidence rates by age, sex, race, length of service, occupation, or combinations such as age-specific rates by occupation. The PDC file is derived from the Enlisted Master File (EMF) supplied by the Navy Military Personnel Command. The EMF contains personnel and service history data members. An extract is copied from the EMF quarterly and this extract provides counts of Navy enlisted personnel broken down by the most frequently used demographic and service history variables and combinations of these.

Quarterly or annual counts reflecting the specific subpopulations of interest are stored on disk and are immediately retrievable. An example of a frequently used combination would be age distributions within occupational specialties for male Caucasian members to compute age-specific hospitalization rates by occupation, sex, and race. Other examples might be black Boiler Technicians aboard destroyers who have less than three years of service or female Hospital Corpsman who have some college education and are pay grade E-6 or above. This file can be used to determine number of individuals, or more commonly, person-years at risk during a specified time period.

#### 4.4 SOFTWARE UNIT DESCRIPTIONS

The following paragraphs describe the major functions of each program and its relationships with files and other programs. The information has been organized hierarchically to provide supporting detail for the diagrams of Section 2.

##### 4.4.1 EMR500 Quarterly Navy Enlisted

The following programs provide users with the capability to copy and reformat the EMR500 input data: EMRCOPY and NEVER105. The input records are reformatted to a common record format to update the social security number verification master with

demographic data. The input records are also reformatted to a common record format in EMRDERV for the TFUPDATE program.

#### 4.4.2 AMON500 Monthly Navy Enlisted Attrition and Accession

The following programs provide users with the capability to copy and reformat the AMON500 input tape: AMONCOPY and NEATT105. The input records are reformatted to a common record format to update the social security number verification master with demographic data. The input records are also reformatted to a common record format in AMONDERV for the TFUPDATE program.

#### 4.4.3 NO1635 Navy Officer

The following programs provide users with the capability to copy and reformat the NO1635 input tape: COPYFILE and NOATT105. The input records are reformatted to a common record format to update the social security number verification master with demographic data.. Under development, the input records will also be reformatted to a common record format in NODERV for the TFUPDATE program.

#### 4.4.4 NOATTR1635 Navy Officer

The following programs provide users with the capability to copy and reformat the NOATTR1635 input tape: COPY1635 and NOATT195. The input records are reformatted to a common record format to update the social security number verification master with demographic data. Under development, the input records will also be reformatted to a common record format in NOATTRDERV for the TFUPDATE program.

#### 4.4.5 USNR Navy Reserve

The following programs provide users with the capability to copy and reformat the USNR165 input tape: COPY165 and NEVER105. The input records are reformatted to a common record format to update the social security number verification master with

demographic data. Under development, the input records will also be reformatted to a common record format in USNRDERV for the TFUPDATE program.

#### 4.4.6 HMF9503 Marine Corps Raw Data

The following programs provide users with the capability to copy and reformat the HMF9503 input tape: COPY1500 and MCVSEP94. The input records are reformatted to a common record format to update the social security number verification master with demographic data. Under development, the input records will also be reformatted to a common record format in MCDERV for the TFUPDATE program.

#### 4.4.7 USMC429 Marine Corps Enlisted and Officer Attrition

The following programs provide users with the capability to copy and reformat the USMC429 input tape: COPY429 and MCADEC92. The input records are reformatted to a common record format to update the social security number verification master with demographic data. Under development, the input records will also be reformatted to a common record format in MCATTDERV for the TFUPDATE program.

#### 4.4.8 INPAT504 Inpatient

The following programs provide users with the capability to copy and reformat the INPAT504 input tape: COPY504 and DERV504. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

#### 4.4.9 MED300 MED Board

The following programs provide users with the capability to copy and reformat the MED300 input tape: COPY300 and MEDEDIT. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

#### 4.4.10 PEB105 Physical Evaluation Board

The following programs provide users with the capability to copy and reformat the PEB105 input tape: COPY105 and PEBEDIT. Under the new Medical Board tracking system, Physical Evaluation Board (PEB) data will be integrated with the Med Board data. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

#### 4.4.11 DEATH93 Death USMC/NAVY

The following programs provide users with the capability to copy and reformat the DEATH93 input tape: COPY93 and DEATHEDIT. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

#### 4.4.12 USMC Address (MCC/RUC)

The following programs provide users with the capability to copy and reformat the MCADDR input tape: COPYFILE and USMCADDR. This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps.

#### 4.4.13 ADD580 Navy Address (UIC)

The following programs provide users with the capability to copy and reformat the ADD580 input tape: COPYFILE and USMCADDR. This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy.

#### 4.4.14 Ports of Call

The following programs provide users with the capability to copy and reformat the PORT80 input tape: PORT80 and PORTSORT. This data is received quarterly on

magnetic cartridge from the CNO and contains data on ship deployments. The input records are copied for input to TFUPDATE program.

#### 4.4.15 DMDC39

The following programs provide users with the capability to copy and reformat the input tape: CREATE46, DUPE46, and MATCH46. This data is received quarterly on magnetic cartridge from DMDC and contains data on RDDB tests.

#### 4.4.16 Service History File

This data file is maintained at NHRC on disk with backup to cartridge. The data from the preceding processes is used as input to update this data file. The file is updated quarterly with the TFUPDATE program.

#### 4.4.17 Population Denominator Count File

This file contains the official Navy/Marine Corps strengths by quarter. This includes enlisted and officer end strengths. This file will match the official Navy/USMC published personnel publications.

**APPENDIX G**

**DATA DICTIONARY**  
**WITH SUPPLEMENTAL DOCUMENTATION**  
**FOR THE NAVY ENLISTED LONGITUDINAL DATABASE**  
(Abridged version)

Complete appendix is available on request.

DATA DICTIONARY  
WITH SUPPLEMENTAL DOCUMENTATION  
for the  
CHAMPS  
(CAREER HISTORY ARCHIVAL  
MEDICAL AND PERSONNEL SYSTEM )  
RESEARCH DATABASE  
(Abridged version)

Complete version is available on request

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## SECTION 1

### SUMMARY

#### 1. SUMMARY

The CHAMPS Research Database is an event-based database containing a record for each individual in the population and information on each career and medical event experienced by that individual. These individually-based records follow personnel from entry into the service through their active-duty careers, and contain a set of unchanging demographic characteristics followed by a chronological set of events, each of which is accompanied by a set of descriptors. The CHAMPS Data Dictionary contains all the CHAMPS data elements with a complete set of their corresponding descriptors. These descriptors include an event code signifying the type of event, the date of the event, the length of service, age, paygrade and rate at the time of the event, and unit identification code.

Specifically, the database contains information on each enlisted member who either has been or is still on active duty from January 1, 1965 to the present. This database was compiled from the monthly Bureau of Personnel (BUPERS) change tape extracts dating from January 1, 1965 to June 30, 1973 and the BUPERS monthly Navy Enlisted Attrition and Accession extract tapes dating from July 1, 1973 to the present. The medical data were compiled from four different databases supplied by the Naval Medical Information Management Center (NMIMC) located at Bethesda, Maryland. The medical data is composed of inpatient hospitalizations, the results of medical evaluation boards, the results of physical evaluation boards, and death records. The database is updated quarterly. As BUPERS and NMIMC codes change over time, new codes are mapped to existing codes so that the data element values in the Navy enlisted database remain constant over time.

This database currently contains records for 3,255,199 service members. The database is organized in chronological order by event date and event code. It typically tracks a member from date of enlistment to date of discharge. Pages 53.00 through 53.04 of the Data Dictionary describe the 14 types of event codes that are tracked. The database is organized in a variable record format. The first 80 characters comprise the demographic record, with each member's demographic elements recorded. This demographic history is described on pages 2.00 through 44.00 of this document. Following the demographic record file within an individual's record, the career and medical events history is maintained chronologically. There can be up to 200 individual events, each event having 92 characters of data, and each representing a specific event occurring during the member's career. Pages 50.00 thru 150.00 of Data Dictionary

contain a full explanation of the personnel history events and pages 200.00 thru 234.06  
contain documentation for the medical history events.

## SECTION 2

### INTRODUCTION

#### 2. INTRODUCTION TO NAVY AND MARINE CAREER/MEDICAL HISTORY

The Naval Enlisted Active Duty and Historical Career/Medical History database contains information on each enlisted member who either has been or is still on active duty from January 1, 1965 to the current date. This data base was compiled from the monthly Naval Military Personnel Command (NMPC) change tape extracts dating from January 1, 1965 to June 30, 1973 and the NMPC monthly AMON extract tapes dating from July 1, 1973 to the current date. The medical data were compiled from four different data bases supplied by the Naval Medical Data Services Center located at Bethesda, MD. The medical data is composed of inpatient hospitalizations, medical boards evaluation results, physical evaluation boards results, and death outcome records. These files contain data from 1965 to the current date. The above six data bases have been edited for consistency and validity and their data elements have remained constant in content. This data base contains 3,255,199 service member records and is updated quarterly. The data base is organized chronologically by event date and event code. Normally, it will track a member from the date of enlistment to the date of discharge. Pages 53.00 thru 53.04 contain documentation on the types of event codes that are tracked.

The data base is organized in a variable record format, the first 80 characters contain the demographic file portion of each member's record. The demographic history is described in pages 2.00 thru 44.00 of this document. Following the demographic portion of the record, there can be up to 200 individual events with 71 characters of data, each related to a specific event affecting the member's career. Pages 50.00 thru 97.00 of this document contain descriptions of the personnel history events. Pages 200.00 thru 234.06 contain descriptions of the medical history events.

## SECTION 3

### INDICES

#### 3.0 INDICES

The Data Dictionary, which is maintained on the IBM mainframe, contains indices to the remaining data in the dictionary. Page numbers were created with decimal notation to for future expansion of the dictionary.

#### 3.1 Index of Events

EVENT	PAGE
Navy and Marine Career/Medical History File	
Newsletter	1.10
Corrections and changes of data elements	1.20
Explanations of derived variables	1.25
Navy and Marine Career/Medical History File Status	1.30
Demographic section	1.40
Accession event codes 100-199	1.41
Pay grade event codes 327-330	1.42
Duty station event codes 501, 502, 503, 504	1.43
Extension event codes 382-387.	1.44
Name change event code 301	1.45
Social Security Number change event codes 344, 998	1.46
UA - AWOL - desertion event codes 391, 951	1.47
Discharge event codes 800-999 except 951	1.48
Ports of Call event code 505	1.49
HIV event codes 660-662.	1.50
Inpatient event codes 601-610.	1.51
Medical Board event code 611	1.52
Physical Evaluation Board event code 612	1.53
Death event code 613	1.54
Event descriptions formats (100-199, 301, 327-330, 344, 382-387, 391, 501-505, 601-613, 660-662, 800-999)	1.75

#### 3.2 Event Abbreviations

The following abbreviations are used for the different types of events. These abbreviations are enclosed by parenthesis, for example: (DUT\_ACC) duty station event, accounting category code.

EVENT	RANGE OF VALUES
DEM = Demographic Format	
ACC = Accession Event	100-199
PAY = Pay/Rate/MOS Event	327-330
DUT = Duty Station Event	501-504
EXT = EXTENSION Event	382-387
NAM = Name Change Event	301
SSN = SSN Change Event	344, 998
UAD = UA/Desertion Event	391&951
DIS = Discharge Event	800-999 except 951
POC = Ports of Call Events	505
HIV = HIV Test Events	660-662
INP = Inpatient Hospitalization Event	601-610
MED = Medical Board Event	611
PEB = Physical Evaluation Board Event	612
DTH = Death Medical Event	613

### 3.3 Index of Variables in Alphabetic Order

The variables included in this document are listed in alphabetic order along with the page number on which it can be found.

VARIABLE	PAGE
'A' School Indicator (NE)	99.40
Accession Event Codes (100-199) Section	1.41
Accounting Category Code (NE, NO)	62.00
Acquisition Type (NE)	69.00
Active Duty Service Date, Start Duty (TF)	50.00
Activity Accounting Category Code (NE, NO)	62.00
Activity Onboard Code (NE, NO)	75.00
Activity Type - See Activity Onboard Code (NE, NO)	75.00
Admission Facility (MTF), (TF)	216.00
Admission Type (TF)	204.00
Admitted to Sicklist (TF)	219.00
Admitting Facility or Reporting Facility (TF)	216.00
Advanced Electronics Field / Nuclear Field (NE)	78.00
Age (TF)	45.00
Age at this Event (TF)	66.00
Age at Time of Event (TF)	66.00

Agree to Extend - Active Duty Obligation School/active	
Duty Obligation Other (ADOS/ADOO) (NE)	81.00
Armed Forces Qualification Test (NE, ME)	21.00
Attrition Indicator (TF)	42.00
Birth Date (TF)	9.00
Branch and Class of Service (NE NO)	70.00
Branch and Class of Service Last Discharged from (TF)	71.00
Cause Code (TF)	208.00
Cause of Injury Code (TF)	220.00
Certificate, Education (TF)	18.00
Citizenship (TF)	17.00
Class Branch Service Last Discharge from (TF)	71.00
Combined Disability Rating (From) (TF)	227.00
Combined Disability Rating (To) (TF)	227.01
Component Codes (TF)	99.80
Corrections or Additions to Navy Enlisted Documentation	1.20
Country or State Codes - See Geographic Area of	
Accident or Place of Death (TF)	234.00
Country Code of Ship Location (NE, NO)	88.00
Current Evaluation (NE)	92.00
Date Admitted (TF)	202.00
Date Event (TF)	52.00
Date Initial Board (TF)	230.00
Date of Death (TF)	202.00
Date of Last Physical Evaluation Board (TF)	222.00
Date of Medical Board (TF)	202.00
Date of Physical Evaluation Board (TF)	202.00
Days Between Events (TF)	65.00
Days Hospitalized (TF)	203.00
Days in Port (NE, NO)	89.20
Death DoD Loss Code (TF)	99.70
Death Event Code 613, Medical Event (TF)	53.01
Death Event Code (613) Section	1.54
Death, Place Of, Medical Event (TF)	234.00
Death Reason Codes - See Death DoD Loss Code (TF)	99.70
Death, Type Of, Medical Event, (TF)	231.00
Defense Military Data Center (DMDC) DoD Loss Codes (TF)	87.80
Demographic Section	1.40
Demotions, Number of (TF)	34.00
Department of Defense Disease and Injury Code (DDDIC)	200.00
Dependents Primary (TF)	15.00

Desertions, Number of (TF)	36.00
Designator, Enlisted (NE)	74.00
Designator, Job, Occupation, USN Officer (NO)	60.10
Designator Code Usn Officers (NO)	60.10
Diagnosis, Medical Events, (TF)	200.00
Disability Combined (TF)	227.00
Disability, Referred to Physical Review Board (TF)	224.00
Discharge Calendar Date (TF)	201.00
Discharge DoD Loss Code Original, (NE)	87.00
Discharge DoD Loss Code Original, (NO)	87.20
Discharge DoD Loss Code Original, (ME, MO)	87.40
Discharge Event Code (TF)	53.02
Discharge Event Codes (800-999 Except 951) Section	1.48
Discharge from Last Class Branch Service (TF)	71.00
DoD Loss (Death) (TF)	99.70
DoD Loss Code Nhrc (TF)	54.00
DoD Loss Code Original, (NE)	87.00
DoD Loss Code Original, (NO)	87.20
DoD Loss Code Original, (ME, MO)	87.40
DoD Loss Code Separation Program Designator (NO)	87.60
DoD Occupational Group (TF)	226.00
Drug or Alcohol Related (TF)	214.00
Duplicate SSN (TF)	4.00
Duty Station Look At, Uic (Unit Identification Code) (TF)	64.00;
PAMI (Personnel Accounting Machine Installation) (TF)	64.00
Duty Station (TF)	212.00
Duty Station Code (TF)	64.00
Duty Station Homeport (NE, NO)	94.00
Duty Station Location Code (TF)	210.00
Duty Station Planned Rotation Date (TF)	91.00
Duty Station Transfer Event Codes (501-504) Section	1.43
Duty Status Codes (ME, MO)	150.00
Education Certificate (TF)	18.00
Education Years (TF)	19.00
Effective Date of Pay Grade (TF)	77.00
EH - (Enlisted History) Status (NE)	48.00
End of Active Obligated Service (EAOS) Date (TF)	51.00
Enlisted Designator Code (NE)	74.00
Enlisted History Status (NE)	48.00
Enlistment Type of (NE)	72.00
Ethnic Group (TF)	12.00

Evaluation, Current (NE)	92.00
Event Code (TF)	53.00
Event Date (TF)	52.00
Event Descriptions	1.75
Existed Prior to Entry into Service (EPTES) (TF)	211.00
Explanations of Derived Variables	1.25
Extension Agree To, Event Code 382 (NE)	81.00
Extension Event Codes (382-387) Section	1.44
Extension Involuntary, Event Code 385 (NE)	99.60
Extension Operative, Event Code 383,384 (NE)	99.50
Extension Reserve Active Duty Obligation 387 (NE)	99.65
Extremities, Residual Condition of (TF)	223.00
Facility, Admitting (TF)	216.00
File Newsletter	1.10
File Status	1.30
General Classification Test (NE, ME)	20.00
Geographic Area of Accident (TF)	234.00
Geographic Area of Accident or Place of Death (TF)	234.00
Geographical Area of Ship Operation (NE, NO)	89.00
Group IV Program	46.00
Hiv Event Codes (660-662) Section	1.50
Hiv Test Event Date (TF)	52.00
Homeport Duty Station (NE, NO)	94.00
Homeport of Ship (NE, NO)	94.00
Indicated Disposition (TF)	221.00
Injury, Cause of (TF)	220.00
Inpatient Hospitalization, Number of (TF)	30.00
Inpatient Hospitalization Event Codes (601-610) Section	1.51
International Classification of Diseases Adapted (ICDA-8)	200.00
International Classification of Diseases (ICD9)	200.00
Introduction to Navy and Marine Career/medical History	1.07
Involuntary Extension Event Code 385 (NE)	99.60
Last Name, First Name (TF)	8.00
Leave Port(NE, NO)	89.70
Length of Service at this Event (TF)	67.00
Length of Service at Time of Event (TF)	67.00
Length of Service (TF)	47.00
Line of Duty (TF)	215.00
Location Code, Duty Station (TF)	210.00
Loss Code DoD Original, (NE)	87.00
Loss Code DoD Original, (NO)	87.20

Loss Code DoD Original, (ME, MO)	87.40
Marital Status (TF)	14.00
Medical Board, Number of (TF)	31.00
Medical Board Event Code (611) Section	1.52
Medical Holding Company (TF)	209.00
Mental Group (TF)	22.00
Military Entrance Processing Station (MEPS) Test (TF)	73.00
Military Obligation Designator (NE)	24.00
Military Occupational Specialities (MOS) (ME, MO)	60.20
Military Theater of Operation (MTO)(TF)	207.00
Military Treatment Facility (MTF), (TF)	216.00
Mission (Ports of Call) (NE, NO)	86.00
MOS, Job, Occupation (ME, MO)	60.20
MTF (UIC) (TF)	212.00
Name Change Event Code (301) Section,	1.45
Naval Training Command at Enlistment (NE)	37.00
Navy and Marine Career/medical History File Newsletter	1.10
Navy and Marine Career/medical History File Status	1.30
Navy Loss Codes, See Attrition Indicator (TF)	42.00
Nec - (Navy Enlisted Classifications) Primary Naval Enlistment Classification Code (NE)	61.00
Nec Secondary Naval Enlisted Classification (NE)	90.00
Negatives	28.00
NHRC - (Naval Health Research Center) DoD Loss Codes (TF)	54.00
NO Is Navy Officer	
Nuclear Field / Advanced Electronics Field (NE)	78.00
Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator (NE)	8.00
Number of Days Between Events (TF)	65.00
Number of Diagnoses (TF)	205.00
Number of Enlistment (NE)	55.00
Number of Inpatient Events (TF)	30.00
Number of Medical Boards (TF)	31.00
Number of Negatives	28.00
Number of Physical Evaluation Boards (TF)	32.00
Number of Positive	29.00
Occupationally Related, Medical Events (TF)	213.00
Ocean Area Codes (NE, NO)	89.00
Old Name (TF)	79.00
Old Social Security Number (TF)	80.00
Onboard Activity Accounting Category Code (NE, NO)	62.00
Onboard Activity Code (NE, NO)	75.00

Operation (Ports of Call) (NE, NO)	83.00
Operative Extension Event Code 383,384 (NE)	99.50
Original DoD Loss Codes (NE)	87.00
Patient Category (TF)	218.00
Pay Entry Base Date (TF)	99.10
Pay Grade (TF)	59.00
Pay Grade Effective Date (TF)	77.00
Pay Grade Event Codes (327-330) Section	1.42
Physical Disability Review Board (TF)	224.00
Physical Evaluation Board, Number of (TF)	32.00
Physical Evaluation Board Event Code (612) Section	1.53
Physical Evaluation Board Location (TF)	225.00
Place of Death, Medical Event (TF)	234.00
Port, Home Duty Station (NE, NO)	94.00
Port Name That Ship Visited (NE, NO)	89.60
Ports of Call Event Code (505) Section	1.49
Ports of Call Mission (NE, NO)	86.00
Ports of Call Operation (NE, NO)	83.00
Ports of Call Sea/shore Codes (NE, NO)	85.00
Port Type, (NE, NO)	82.00
Positive	29.00
Primary Dependents (TF)	15.00
Primary Naval Enlistment Classification (PNEC) Code (NE)	61.00
Program/school at Enlistment (NE)	40.00
Program/school Rate at Enlistment (NE)	41.00
Promotions, Number of (TF)	33.00
Race (TF)	11.00
Rate Abbreviation, See Nec Primary Naval Enlistment Classification Code (NE)	61.00
Rate Authorization Code (NE)	76.00
Rate Code (NE)	60.00
Re-enlistment Quality Control Code (NE, ME)	57.00
Recommended Re-enlistment (NE)	27.00
Recruit Naval Training Command (NE)	37.00
Recruit Program at Enlistment (NE)	39.00
Recruit Program/school (NE)	40.00
Recruit Program/school Rate (NE)	41.00
Recruit Type Enlistment (NE)	38.00
Referred to Physical Disability Review Board (TF)	224.00
Regular/reserve (NE, NO)	58.00
Regular/reserve Branch Class (NE, NO)	68.00

Regular/reserve Indicator (NE, NO)	26.00
Religion Codes (ME, MO)	13.00
Reporting Facility (MTF), Medical Events Only (TF)	216.00
Reserve Active Duty Obligation (RADO) Extension 387 (NE)	99.65
Residual Condition of Extremities (TF)	223.00
Rotation Planned Date, Duty Station (TF)	91.00
School Course (NE)	93.00
School Date (NE)	93.00
School History (NE)	93.00
Screen Score (NE)	23.00
Sea/shore Code (NE, NO)	99.35
Sea/shore Codes (Ports of Call) (NE, NO)	85.00
Sea/shore Duty Indicator (NE, NO)	25.00
Second MOS USMC, (Same as Primary MOS) (ME, MO)	60.20
Secondary Naval Enlisted Classification Code (NE)	90.00
Service Code (TF)	3.00
Sex (TF)	10.00
Ship Type (NE, NO)	89.40
Sicklist, Admitted to (TF)	219.00
Six Year Obligation Indicator (TF)	99.30
Social Security Number Change Event Codes (344, 998) Section	1.46
Social Security Number/service Number (TF)	5.00
SSN Verify (TF)	6.00
SSN/name Change (TF)	7.00
State of Enlistment (TF)	16.00
Subspecialty Navy Officer (NO)	98.00
Surgical Code (TF)	217.00
Surgical Procedure (TF)	217.00
Term of Enlistment (NE)	56.00
Term Status / Enlistment Number (NE)	63.00
Term Status Code (NE)	63.00
Test Code (HIV)(TF)	200.00
Total Demotions (TF)	34.00
Total Desertions (TF)	36.00
Total Force Status (TF)	44.00
Total Number of Change Events (TF)	2.00
Total Number of Inpatient Hospitalizations (TF)	30.00
Total Number of Medical Boards (TF)	31.00
Total Number of PEB - (Physical Evaluation Board) Boards (TF)	32.00
Total Promotions (TF)	33.00
Total UA/AWOLS (TF)	35.00

Transaction Type Death - Medcom (TF)	232.00
Transaction Type Death (TF)	233.00
Transaction Type Physical Evaluation Board (From) (TF)	228.00
Transaction Type Physical Evaluation Board (To) (TF)	228.01
Transaction Type Release (TF)	206.00
Type Acquisition Code (NE)	69.00
Type Activity - See Activity Onboard Code (NE, NO)	75.00
Type Admission (TF)	204.00
Type Death (TF)	231.00
Type Enlistment, Initial Entry (NE)	38.00
Type of Enlistment (NE)	72.00
Type Operation1 (NE, NO)	83.00
Type Operation2 (NE, NO)	83.00
Type Transaction Death Medcom (TF)	232.00
Type Transaction Death (TF)	233.00
Type Transaction Inpatient Release (TF)	206.00
Type Transaction Physical Evaluation Board (TF)	228.00
UA - AWOL - Desertion Event Codes (391, 951) Section	1.47
UA/AWOLS, Number of (TF)	35.00
UIC (Unit Identification Code) USN (TF)	64.00
Unit Designator Code (UDC) (NE, NO)	84.00

## **APPENDIX H**

### **QUALITY ASSURANCE DOCUMENT FOR THE NAVY ENLISTED LONGITUDINAL DATABASE**

## Reference Material for the Navy Enlisted Longitudinal Database Documentation File

Table 1

<u>Reference</u>	<u>Data Element</u>	<u>Update Action</u>
1. JUMPS/MMSCODESMAN	Religion codes and descriptions	Added 155 Religion codes and descriptions.
2. JUMPS/MMSCODESMAN	Component codes and descriptions	Added 61 Component codes and descriptions.
3. Data Element Dictionary for the Officer Personnel Information System dated 2/1/93.	DOD Loss codes and descriptions - Separation Program Designator	Added 215 DOD Loss codes and descriptions - Separation Program Designator.
4. Accounting Category Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Onboard Accounting Category Codes	Reconciled Onboard Accounting Category Codes. Added codes 355 and 356.
5. Race Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Race Codes	Reconciled Race Codes.
6. Shore Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Sea Shore Codes	Reconciled Sea Shore Codes.

<u>Reference</u>	<u>Data Element</u>	<u>Update Action</u>
7. Death Loss Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	DOD Death Loss Codes	Reconciled DOD Death Loss Codes.
8. Accounting Category Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. Added Code 323.	Onboard Accounting Category Codes	Reconciled Onboard Accounting Category Codes.
9. Country Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station Location Codes	Reconciled Duty Station Location Codes
10. Country or State Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Geographic Areas of Accident or Place of Death Codes	Reconciled Geographic Areas of Accident or Place of Death Codes. Some Country Codes are not in agreement. See Comments.
11. Death Reason Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	DOD Death Loss Codes	Reconciled DOD Death Loss Codes.
12. Dependency Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Primary Dependency Codes	Reconciled Primary Dependency Codes. Missing numeric codes for eight Married with Military Spouse categories.

<u>Reference</u>	<u>Data Element</u>	<u>Update Action</u>
13. Educational Certification/Designator Tables - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Educational Certificate Codes	Reconciled Educational Certificate Codes
14. Enlistment Type Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Type of Enlistment Codes	Reconciled Type of Enlistment Codes.
15. Reconciled Ethnic Group Codes to Ethnic Group Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Ethnic Group Codes	Reconciled Ethnic Group Codes
16. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station Homeport Codes	Reconciled Duty Station Homeport Codes.
17. Military Obligation Designator Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. - Tables are not in agreement.	Military Obligation Designator Codes	Reconciled Military Obligation Designator Codes.

<u>Reference</u>	<u>Data Element</u>	<u>Update Action</u>
18. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Event Codes	Reconciled Event Codes.
19. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	DOD Loss Codes	Reconciled DOD Loss Codes.
20. Rate Abbreviation Table and Rating Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Rate Codes - Navy Enlisted	Reconciled Rate Codes- Navy Enlisted.
21. Rate Abbreviation Table and Rating Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Recruit Program/School Rates	Reconciled Recruit Program/School Rates.
22. Sea Shore Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Sea Shore Codes	Reconciled Sea Shore Codes.

<u>Reference</u>	<u>Data Element</u>	<u>Update Action</u>
23. Type Acquisition Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Type Acquisition Codes	Reconciled Type Acquisition Codes.
24. Country or State Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Reconciled State of Enlistment Data	Reconciled State of Enlistment Data.
25. Navy Loss Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Attrition Indicators	Reconciled Attrition Indicators.
26. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Ships by Type	Reconciled List of Ships by Type.
27. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station (Ship Type)	Reconciled Duty Station (Ship Type)
28. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Onboard Activity Codes (Ship Type)	Reconciled Onboard Activity Codes (Ship Type)

## Reconciliation of Demographic, Medical, and Service History Data Element References

Table 2

Reconciled Data Elements

Table of Demographic Variables.

Table of Duty Station Transfers Event Codes 501-503.

Table of Service History Event Code 504.

Table of Hospitalization Event Codes 601-610.

Table of Medical Board Event Code 611.

Table of Physical Evaluation Board Event Code 612.

Table of Death Event Code 613.

Table of HIV Testing Results and Diagnosis Event Codes 660-679.

## Events Codes Cross Reference

Table 3

Compared events (codes and descriptions to each page of the document that referenced the event codes.	a. Event Code Groups
	Accession Event Codes Deserctions Event Codes Pay Grade and Rate Event Codes Name Change Event Code SSN Change Event Codes Extension Event Codes Duty Station Transfers Event Codes Discharge Event Codes
	b. Military Obligation Designator Controlling Event Codes 101-111, 130-151, 181-188, 194-195, and 334.
	c. Total Number of Inpatient Hospitalizations Count Event Code 601
	d. SSN/Name Change Events 301 and 344
	e. Total Promotions Count Event Code 328
	f. Total Demotions Count Event Code 327
	g. Total UA/AWOL Count Event Code 392
	h. Total Deserctions Count Event Code 951

Compared events (codes and descriptions to each page of the document that referenced the event codes.

- i. Total Number of Medical Boards Count Event Code 611
- j. Total Number of Physical Evaluation Boards Count Event Code 612
- k. Attrition Indicator Event Codes 801 - 999 (13 event descriptions are not in agreement for the following codes: 806, 833, 932, 813, 887, 954, 955, 956, 957, 958, 959, 960, 961) Added codes 839, 879, 962-969. Thirteen codes were identified as obsolete during the comparison.
- l. Recruit Naval Training Command Derived by Event Codes 101, 103, 110, 111, and 195. (Need to enter the year when NTC Bainbridge was closed.)
- m. DoD Loss Codes (Severity of Navy/USMC Loss Code)
- n. Type Acquisition Codes Controlling Event Codes 101-111, 130-151, 181-188, 194-195
- o. Branch and Class of Service Controlling Event Codes 101-111, 130-151, 181-188, 194-195
- p. Branch and Class of Service Last Discharged From Controlling Event Codes 101-111, 130-151, 181-188, 194-195, 801-998
- q. Type of Enlistment Controlling Event Codes 101-111, 130-151, 181-188, 194-195
- r. Enlisted Designator Code (USN Enlisted Only) Controlling Event Codes 101-111, 130-151, 181-188, 194-195, 334, 501, 502, 801-998. Added additional location in event format "26 for Duty Station Transfers". Reference: Service History Event Record for Duty Transfers. Code 334 is not listed in Event Codes.
- s. Onboard Activity Code Controlling Event Codes 191-193, 391-393, 501-502, 951. Event Codes relate to Desertion, Unauthorized Absence, and Confinement. Are these correct controlling event codes?

Compared events (codes and descriptions) to each page of the document that referenced the event codes.

Compared events (codes and descriptions) to each page of the document that referenced the event codes.

- t. Rate Authorization Code Controlling Event Codes 327-330
- u. Effective Date of Pay Grade Controlling Event Codes 327-330
- v. "A" School Indicator Controlling Event Codes 327-330
- w. Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator Controlling Event Codes 327-330
- x. Old Last Name, First Name Controlling Event Code 301
- y. Old Social Security Number Controlling Event Codes 344 and possibly 998
- z. SSN Verify Controlling Event Codes 344 and possibly 998
- aa. Agree to Extend ADOS/ADOO Controlling Event Code 382
- ab. Operative Extension ADOS/ADOO Controlling Event Codes 383-384 where 384 is bonus
- ac. Involuntary Extension ADOS/ADOO Controlling Event Code 385
- ad. Reserve Active Duty Obligation Controlling Event Code 387
- ae. Original DoD Loss (Navy Enlisted) Codes Controlling Event Codes 801-998, Except 951
- af. DoD Death Loss Codes Controlling Event Code 952
- ag. Secondary Naval Enlistment Classification Code Controlling Event Codes 801-998, Except 951
- ah. Duty Station Planned Rotation Date Controlling Event Code 501

## Data Elements Cross-Referenced to Derived Variables

Table 4

Compared cross-referenced data or items within the document.

Regular Reserve Code	Regular Reserve Indicator Regular Reserve
GCT to AFQT Conversion	Screen Score Mental Group
SPC Rate and Occupational Specialty	Recruit Program/School Recruit Program/School Rate Occupation Specialty
Derived variables	Event Code Explanation of Derived Variables
Branch/Class Codes	Regular Reserve Branch and Class of Service Branch and Class of Service Last Discharged From Codes 11-23 and 25-78
Enlisted Designator Code	Enlisted Designator Code - USN Enlisted Only Event Code Groups
Cause Codes	Refers Codes 50* through 99* to other elements in the document
Patient Category	Medical Board Record (Event 611), Physical Evaluation Board (Event 612), Death Record (Event 613). Hospitalization Record should be event 601-610 per Event Codes.

## Geographic Areas of Accident or Place of Death Codes to Country or State Codes.

Table 5

Compared Geographic Areas of Accident or Place of Death Codes to Country or State Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. Some Country Codes are not in agreement.

<u>Areas of Accident or Place of Death Codes</u>	<u>Country or State Code Table</u>
AS = Asia	AS = Australia
AT = Australia	AT = Ashmore and Cartier Islands
BG = British Guiana	BG = Bangladesh
CA = Canary Islands	CA = Canada
CN = Canada	CN = Comoro Is.
CT = Corsica	CT = Central African Republic
CD = Central African Rep	CD = Chad
TW = Taiwan, Formosa	TW = China, Republic of
CF = Clipperton Islands	CF = Congo (Brazzaville)
CR = Crete	CR = Coral Sea Island Territory
DA = Dahomey	DA = Denmark
DE = Denmark	DM = Dahomey
DO = Dodecanese Island	DO = Dominica
FT = Fiji, Tonga Islands	FT = French Territory of the Afars and Issas
GE = East Germany	GE = Germany, Federal Republic of
GC = Gabon	GC = Germany, East
GY = Germany, Saar	GY = Guyana
IL = Iceland	IC = Iceland
JN = Jan Mayen Island	JN = Juan Mayen
KS = South Korea	KS = Korea, Republic of
MA = Malagasy Rep,	MA = Madagascar Comoro Island
MI = Marshall Islands	MI = Malawi
ML = Malta, Comino Is.	ML = Mali
MT = Mauritania	MT = Malta
MR = Mascarene Island,	MR = Mauritania Chagos Island
NA = North America	NA = Netherlands Antilles
NE = Netherlands	NE = Niue
	NL = Netherlands
MU = Marcus Islands	MU = Oman
PC = Pacific Ocean,	PC = Pitcairn S. China Sea

## List of Inconsistencies That Need to be Rectified.

Table 6

List of questions that require clarification or a determination for missing or questionable data.

<u>Questions - Recommended Action</u>	<u>Answers - Recommended Action</u>
Is there a current NAVPERS 15,642?	_____
1. Page 1.20 - Items 37-40 are out of order with effective dates. Item 46 is listed 3 times (last 46s should be 47 and 48).	1.
2. Page 1.25 is missing information for Explanations of Derived Variables.	2.
3. Page 1.30 - Navy and Marine Career/Medical History File Status - Needs to be updated.	3.
4. Page 1.40 - Demographic Variables - Position 43 (Sea/Shore Duty Indicator (DEM_SS)). This item is not in the Index - Page 1.04 shows DEM_SSIN.	4.
5. Page 1.50 - Service History Event Code 504 (Ports of Call) - Positions 1-5 (Activity Code for Ships (POC-ACTY) refers to Page 75.00. Page 75.00 describes Onboard Activity Codes with 10 positions in Event Format 51-60.	5.
6. Page 1.70 - Physical Evaluation Board (Code 612) - Positions 19-21 (Extremities (PEB_EXTM) refers to Page 223.00. Page 223.00 describes the field as a 1 position field in Event Format 19.	6.
7. Page 1.70 - Death Event (Code 613) - Position 40 (Admitted to Sicklist (DTH_SICK) refers to Page 219.00. Page 219.00 shows the field location in Event Format 22.	7.
8. Page 1.76 - Discharge Event Codes - Positions 54-55 (Class Branch Service Last Discharge From (DIS_BRCL) refers to Page 71.00. Page 71.00 shows the fields located in	8.

## **APPENDIX I**

# **EPIDEMIOLOGICAL PROJECTION INTERACTIVE SYSTEM (EPISYS) MANUAL**

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## 1.0 INTRODUCTION

### 1.1 Overview

EPISYS is an acronym for Epidemiological Projection Interactive System. EPISYS has been developed over the last five years by Dr. Ivan T. Show of Southwest Research Associates, Inc. (SRA) in conjunction with the Naval Health Research Center, San Diego, CA (NHRC).

The purpose of EPISYS is to rapidly access, analyze, and summarize large amounts of epidemiological data. To this purpose, data from various sources is organized into a single standardized file called the Common Data Format (CDF) file. As of 30 September 1993, the CDF contains over 481,000 in-patient records covering the time period from 1 January 1980 through 31 December 1988. Within the next few months, the CDF will be expanded to approximately 640,000 records covering the time period from 1 January 1980 through 31 December 1994. The current CDF is limited to treatment records for US Navy enlisted personnel. Each record includes the following items:

- patient information
  - sex
  - age
  - service branch - USN/USMC
  - occupation rate
  - duty platform - ashore/ship type
  - ocean reporting region
  - duty UIC
  - social security number
- treatment information
  - treatment date
  - treatment UIC
  - visit sequence number
  - code indicating return to duty
  - NHRC diagnosis/ classification code

Note: Full information is not yet available on duty platforms and ocean reporting regions.

EPISYS handles both frequencies and incidence rates. Incident rate calculations are supported by the Denominator Data File (DDF). The DDF contains "total person-days at risk" cross-classified by sex, age, branch, grade, occupation rate, duty platform and ocean region. The DDF also supports the calculation of age-adjusted and standardized incidence rates.

EPISYS runs very quickly. Ongoing research has shown the system capable of producing a complete analysis in as little as five minutes. Very complex analyses are usually completed in less than one hour. EPISYS is simple to use and relatively self-explanatory.

## 1.2 Hardware Requirements

EPISYS is designed to run on standard IBM PC equipment. The following is required:

- computer: IBM PC or fully compatible
- processor: 80486DX-33MHz (80386/80387 not recommended)
- RAM: at least 4 megabytes configured as Extended Memory
- disk drive: at least 120 megabyte hard drive and 3 1/4" floppy
- tape: internal streaming recommended
- video: Tseng-4000 or later with VESA super-VGA compatibility
- monitor: analog, super-VGA compatible
- printer: LQ1500 or Post-Script compatible recommended
- mouse: IBM compatible (serial port or bus)

The processor must have the minimum capabilities of the 80486DX; any 80486 with greater capability is acceptable. Minimum processor speed for efficiency is 33 Mhz although a faster processor can be used. It is possible to use an 80386 based computer; however, it is not recommended. If an 80386 based computer is used, it MUST have an 80387 math coprocessor installed.

EPISYS makes extensive use of super-VGA graphics and is very sensitive to video capabilities. Therefore, it is absolutely essential that a video board be installed that is based on the Tseng 4000 video driver. The board must also have VESA super-VGA capability. Video board and monitor must be capable of displaying 1024x768 resolution and 256k colors.

## 1.3 Software Requirements

EPISYS runs under DOS 6.0 and WINDOWS 3.1 and uses capabilities unique to these operating systems. Unpredictable results occur if other versions of DOS or WINDOWS are used. It is strongly recommended that the DOS DBLSPACE utility NOT be used. DBLSPACE (a disk file compression utility) can lead to serious problems if a large proportion of the hard disk capacity is used.

AUTOEXEC.BAT and CONFIG.SYS should be configured as shown below, then the DOS MEMMAKER utility run to optimize memory allocation. After MEMMAKER is done, run MEM and observe "Largest executable program size" (second line from the bottom); this number must be at least 615k for all EPISYS modules to execute properly. In the following, assume that EPISYS has been placed in the subdirectory C:\EPISYS.

**AUTOEXEC.BAT:**

Path (add C:\EPISYS and C:\WINDOWS)

LH SMARTDRV 2048

LH MOUSE.COM

LH DPMIMEM=maxmem 2048

SET TEMP= C:\WINDOWS\TEMP

\* NOTE: MEMMAKER might modify the SMARTDRV and MOUSE commands.

CONFIG.SYS:   DEVICE        =HIMEM.SYS  
              DEVICE        =EMM386.EXE NOEMS HIGHSCAN\*  
              DOS            =UMB  
              DOS            =HIGH  
              DEVICEHIGH ANSI.SYS\*  
              LASTDRIVE = C (highest drive letter)  
              BUFFER        = 20,0  
              FILES         = 40  
              FCBS          = 1,0  
              BREAK         = ON  
              STACKS        = 9,256

\*NOTE: MEMMAKER might modify the EMM386 and ANSI.SYS commands.

DOS 6.0 uses a menu system for variable AUTOEXEC.BAT and CONFIG.SYS configurations. If the computer has programs requiring different configurations, it might be necessary to incorporate multiple boot options in the AUTOEXEC.BAT and CONFIG.SYS files in order to successfully run EPISYS.

#### 1.4 Installation

EPISYS executable modules and essential support files are on four 3 1/4" floppy disks. The CDF and DDF files are on a variable number of 3 1/4" floppy disks. For a complete installation, executable modules and CDF and DDF files must be placed on the hard drive.

#### TO INSTALL EPISYS EXECUTABLE MODULES:

1. Make directory: C:\EPISYS
2. Go to directory: C:\EPISYS
3. Place "EPISYS DISK" in 3 1/4" drive (assume A:).
4. Run: A:INSTALL.

5. Repeat steps 3 and 4 for "EPISYS DISK 2" through "EPISYS DISK 4."

#### TO INSTALL CDF AND DDF FILES:

1. Go to directory: C:\EPISYS.
2. Run: LOADCDF.
3. Follow the instructions on the screen. Switch floppy disks when instructed to do so.

#### 1.5 Startup

Before attempting to run EPISYS, make sure that all steps described in sections 1.3 and 1.4 have been completed and that the computer has been booted under the proper configuration.

#### TO START EPISYS:

1. Go to directory: C:\EPISYS.
2. Run: GOEPSISYS.

Windows loads and the EPISYS Logo screen appears.

3. Press <ENTER>.

The EPISYS Desktop appears

4. Click the "Maximize Button" (upper right corner of screen). EPISYS is loaded and ready to run.

#### 1.6 Using Menus

All menus operate according to the Microsoft SAA/CUA standard for Graphic User Interfaces. This means that they operate identically to menu systems in literally all other WINDOWS applications. A user familiar with any WINDOWS application can therefore easily operate EPISYS. The EPISYS menus are part of the EPISYS Desktop (see section 2. for further details).

#### TO OPERATE EPISYS MENUS:

1. Click on main menu item.

Drop-down menu appears

2. Click on drop-down menu item.

Dialog appears. When the operation is complete, system returns to EPISYS Desktop.

3. If wrong main menu item selected:
  - 3a. Click on correct main menu item from anywhere in drop-down menus. New drop-down menu appears.
  - 3b. Click on any blank portion of EPISYS Desktop. Drop-down menu disappears.

## 1.7 Using Dialog Controls

All dialogs operate according to the Microsoft SAA/CUA standard for Graphic User Interface. This means that they operate identically to dialogs in literally all other WINDOWS applications. See sections 4.0, 5.0, and 6.0 for details on all EPISYS dialogs.

### TO ENTER VALUES IN TEXT/NUMERICAL INPUT FIELDS:

1. Desired field not active:
  - 1a. Press <TAB> or <SHIFT-TAB>. Highlight appears and moves.
  - 1b. Click anywhere in desired field. Editing cursor appears.
2. Active field highlighted:
  - 2a. To replace old value, immediately type new value. Previous value is automatically erased. <DEL> also erases out value.
  - 2b. To edit old value, press <HOME> or <ARROW> key. Highlight disappears and editing cursor appears.
3. Editing cursor in active field:
  - 3a. Press <DEL> or <BACKSPACE> to erase parts of old value.
  - 3b. Type new value.
  - 3c. Press <INS> to toggle between Insert and Typeover mode.
  - 3d. Press <TAB> or click in another field to exit field and accept value.
4. If value entered out of range, warning message appears. Click "OK" or press <RETURN>, then reenter Value.

TO PICK AN ITEM FROM SELECTION LIST:

1. Single selection list:
  - 1a. To select, click on item. Selected item is highlighted.
  - 1b. To de-select, click on any other item. Highlight disappears.
2. Multiple selection list:
  - 2a. To select, click on each desired item. Selected items are highlighted.
  - 2b. To de-select, click on highlighted items. Highlights disappear.
3. More items than will fit in list box:
  - 3a. Scroll bar appears.
  - 3b. To scroll up or down one item, click top or bottom button.
  - 3c. To scroll up or down one page, click scroll bar above or below position marker.

TO PICK AN ITEM FROM OPTION LIST:

1. Operates as standard Radio Button List.
  - 1a. Only one option may be selected from list.
  - 1b. Button to left of selected option is highlighted.
  - 1c. One option is always selected.
2. To select, click button or click on item description.

TO ACTIVATE CONTROL OPTION:

1. Operates as standard Push Button.
  - 1a. Initiates immediate system action.
  - 1b. Default or active option has its label highlighted.
2. To activate default or active option, click option or press <RETURN>.
3. To activate non-active option, click option.

MEANING OF SPECIFIC CONTROL OPTIONS

1. OK: Accept everything in dialog and return to previous level.
2. CONTINUE: Execute current dialog selections.
3. CANCEL: Reject changes in dialog or abort execution of dialog selections.  
Return to dialog or previous level.
4. DONE: Dialog selections complete. Return to previous level.
5. ACCEPT: Reset dialog to reflect changes.
6. REJECT: Reset dialog to previous state.

## 2.0 MAIN OPTIONS

### 2.1 Desktop

The EPISYS Desktop contain five options. These options are the main menu items used to control the system. Each main menu item has a submenu. Menus and sub-menus are described in section 1.4. Figure 1 shows the EPISYS desktop menu structure. Each menu item is discussed in subsequent sections.

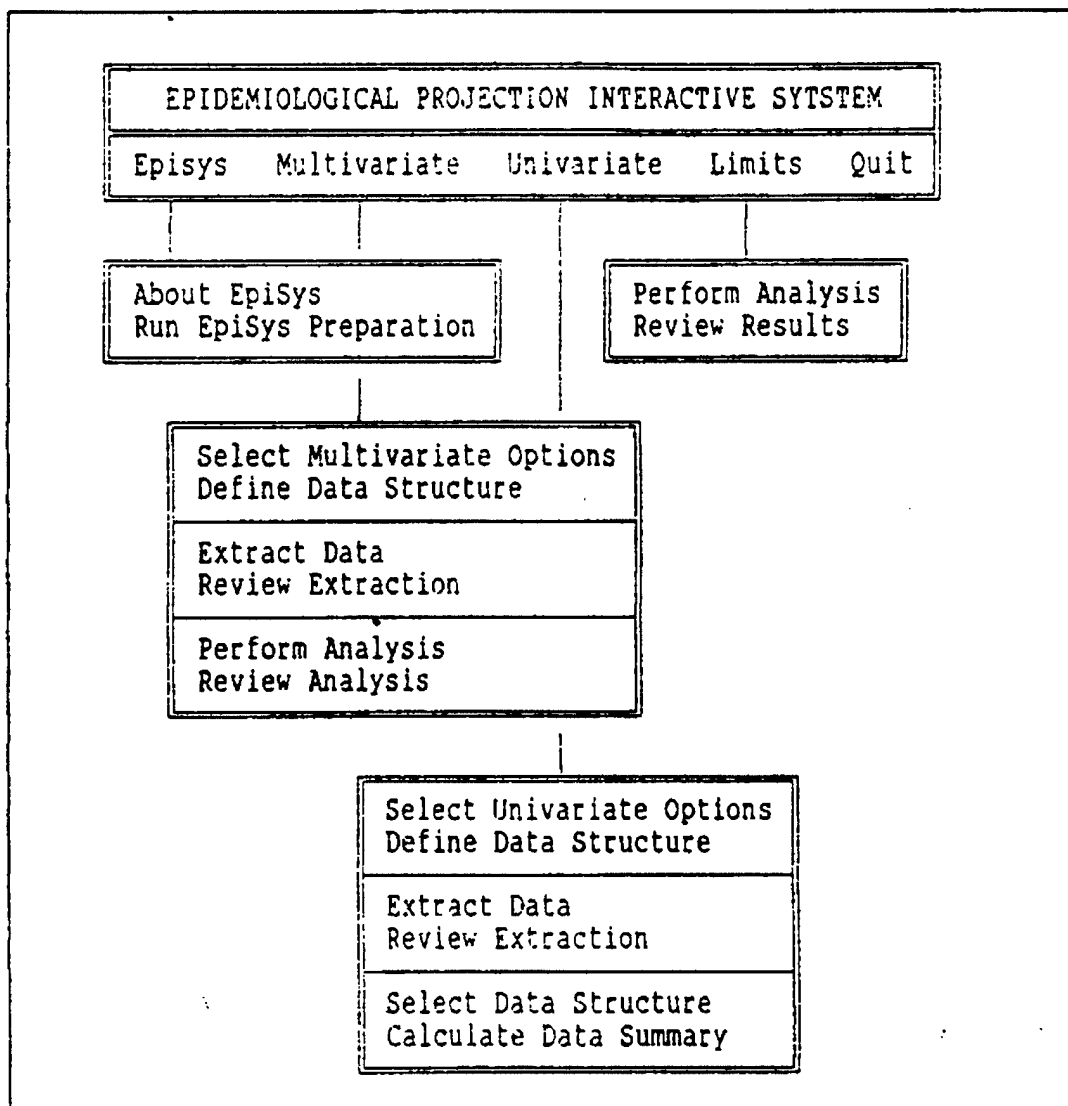


Figure 1. EPISYS Desktop and Menu Options.

## 2.2 Menus

Each main menu item (except QUIT) selects a major EPISYS module. The following defines the purpose of each module:

- Episys: System initialization on first-time start displays EPISYS logo screen. In a future update, this will be the entry point into the help system.
- Multivariate: Analysis of multiple simultaneous dependent variables: NHRC codes and month-of-the-year. NHRC codes may be individual 5-digit NHRC codes, one of 29 major NHRC categories, or one of 130 minor NHRC categories (see the Technical Reference for definitions of major and minor categories). Independent ancillary variables are analyzed for their effects on the dependent variables; these include sex, race, age, branch, grade, occupation, platform and ocean region. Sampling stratification and size allocation are also included.
- Univariate: Analysis of single dependent NHRC codes or major or minor NHRC categories. Frequencies and rates are calculated as well as age-adjusted and standardized rate summaries. Raw time series and spectral density analyses are produced.
- Limits: A screening module, designed to be run each time the CDF file is updated. Produces time series graphics and written reports indicating time periods when major or minor NHRC category rates exceed local or global confidence limits.
- Quit : Safe option for exiting EPISYS. Returns control to WINDOWS.

### 3.0 EPISYS OPTION

#### 3.1 About Episys

This sub-menu item displays the EPISYS logo screen. To return to the EPISYS Desktop, press <RETURN>.

#### 3.2 Run Episys Preparation

This sub-menu item performs first-time system initialization. When it is selected, the dialog shown in Figure 2 appears.

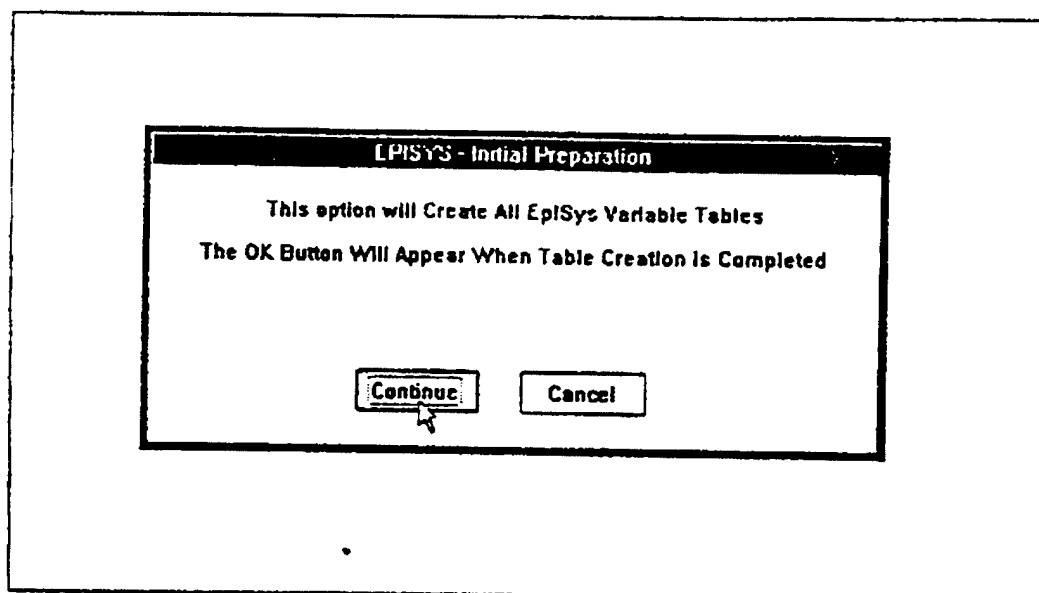


Figure 2. Episys Preparation Dialog

#### TO PERFORM EPISYS PREPARATION:

1. To perform initialization, click "CONTINUE."
2. To abort initialization, click "CANCEL."

On completion, systems returns to EPISYS Desktop.

If EPISYS has been newly installed or modified, this option MUST be run before any analysis can be performed.

**CAUTION!** This option resets EPISYS to an initial start-up state. If it is executed, some or all previous analyses might be lost.

## 4.0 MULTIVARIATE OPTION

### 4.1 Overview

The multivariate option performs analyses based on the simultaneous dependent variables NHRC category and month-of-the-year. NHRC categories can be major categories, minor categories, or individual NHRC diagnosis/classification codes. The analyses include the following (see NHRC Technical Report N66001-89-0185 for analytical methods):

- incidence frequencies tabulated by independent ancillary variable sex, race, age, branch, grade, occupation, duty platform, and ocean region.
- classification analysis and two-way tables based on the two dependent variables.
- multiple discriminant analysis to show the response of the dependent variables to the independent ancillary variables.
- sample stratification and size allocation based on the independent ancillary variables.
- raw time series and spectral density analysis.

There are six sub-menu items under Multivariate Analysis. Note that for a completely new multivariate analysis, each menu item must be completed in order. If this is not done, unexpected results could occur. If an item is selected that requires of a previous analysis and that analysis has not been performed, a warning message appears with information on how to remedy the error. Each sub-menu item is described in subsequent sections.

### 4.2 Select Multivariate Options

When this item is selected, the dialog shown in Figure 3 appears.

#### TO ENTER/MODIFY CONFIDENCE LEVEL ASSOCIATED WITH TYPE I ERROR:

1. Enter or modify value according to instructions in section 1.7.
2. If value is out of range, a warning message appears. Click "OK" or press <RETURN>, then reenter value.

Several multivariate analyses use statistical tests of significance. The confidence level is the probability of accepting a test result as true when it is, in fact, true; the same value is used for all multivariate analyses.

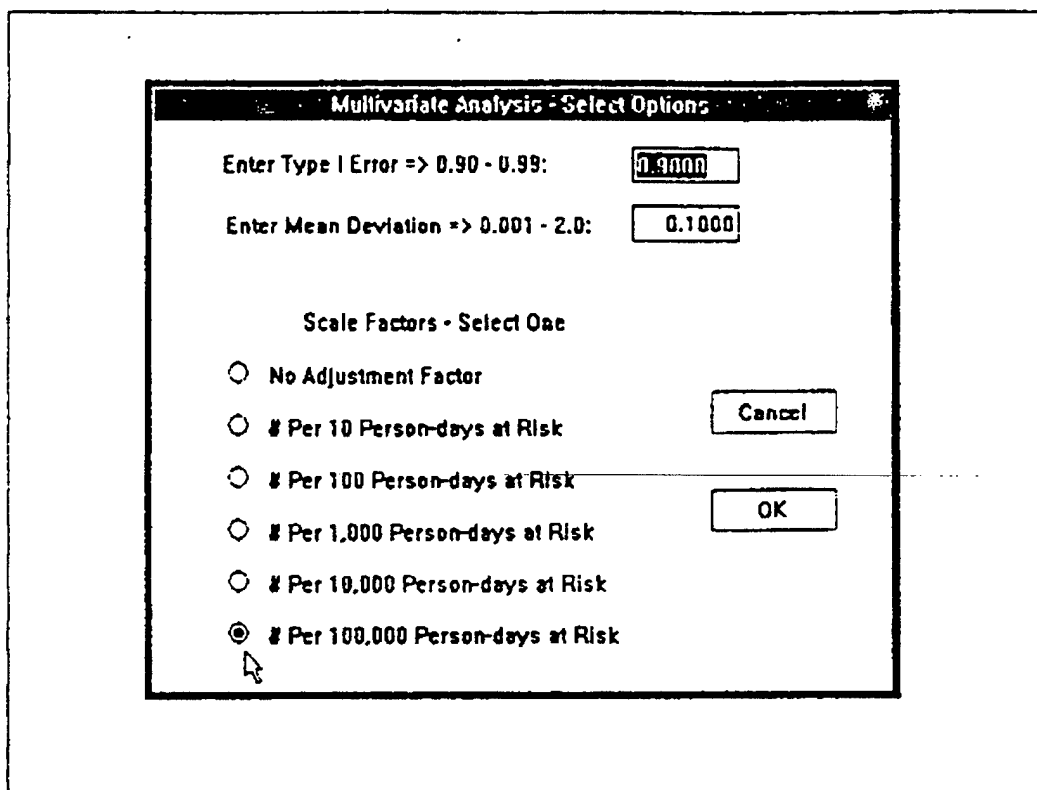


Figure 3. Multivariate Option Dialog.

TO ENTER/MODIFY MEAN DEVIATION:

1. Enter or modify according to instructions in section 1.7.
2. If value is out of range, a warning message appears. Click "OK" or press <RETURN>, then reenter value.

Mean deviation is used to determine stratified sample sizes. For instance, a value of 0.1 results in sample sizes large enough to detect a 10% difference between mean incident rates. The smaller the value, the larger the sample sizes.

TO SELECT SCALING FACTOR FOR INCIDENCE RATE OUTPUT:

1. Select scale factor according to instructions in section 1.7.

Value has no effect on analyses, only output. Only one scaling factor may be selected. Figure 3 demonstrates selection of "# per 100,000 person-days at risk" as the scaling factor.

**TO EXIT:**

1. To save selections, Click "OK."
2. To discard selections, Click "Cancel":

System will return to EPISYS Desktop.

#### 4.3 Define Data Structure

This option selects the EPISYS data management module. When selected, the dialog shown in Figure 4 appears.

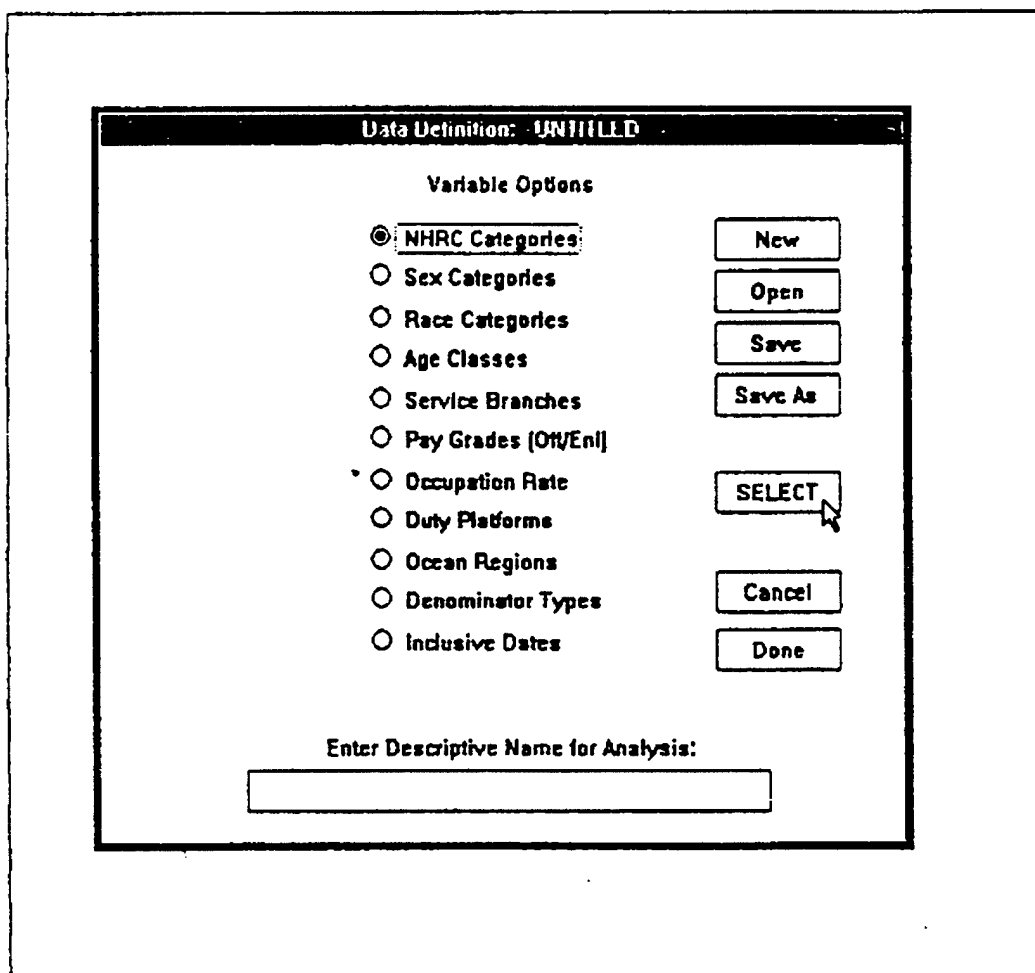


Figure 4. Data Definition Dialog

TO CREATE NEW DATA DEFINITION:

1. Click "NEW."

This can be done at any time. A default definition is created and "UNTITLED" appears in the dialog caption.

2. Modify default definition (see procedure below).
3. Enter descriptive name (see procedure below).
4. Name new definition (see procedure below).

TO ACCESS AND MODIFY EXISTING DATA DEFINITION:

1. Click "OPEN."

Dialog changes to Figure 5.

2. Select definition name according to instructions in section 1.7.
3. To accept or reject highlighted name, click "OK" or "CANCEL" (below selection list).

Dialog changes back to Figure 4. Selected definition becomes active and its name appears in the dialog caption.

TO NAME NEW DEFINITION:

1. Click "SAVE AS."

Dialog changes to Figure 6.

2. Enter name in "Save Definition As" field according to instructions in section 1.7. Name must begin with a character and must be one to eight characters long. Upper and lower case does not matter. No blanks are allowed.

3. To accept or reject name, click "OK" or "CANCEL" (below selection list).

Dialog changes back to Figure 4. Selected definition becomes active and its name appear in the dialog caption.

If name already exists, a warning message appears offering the opportunity to abort. Otherwise, the existing definition with the same name will be overwritten.

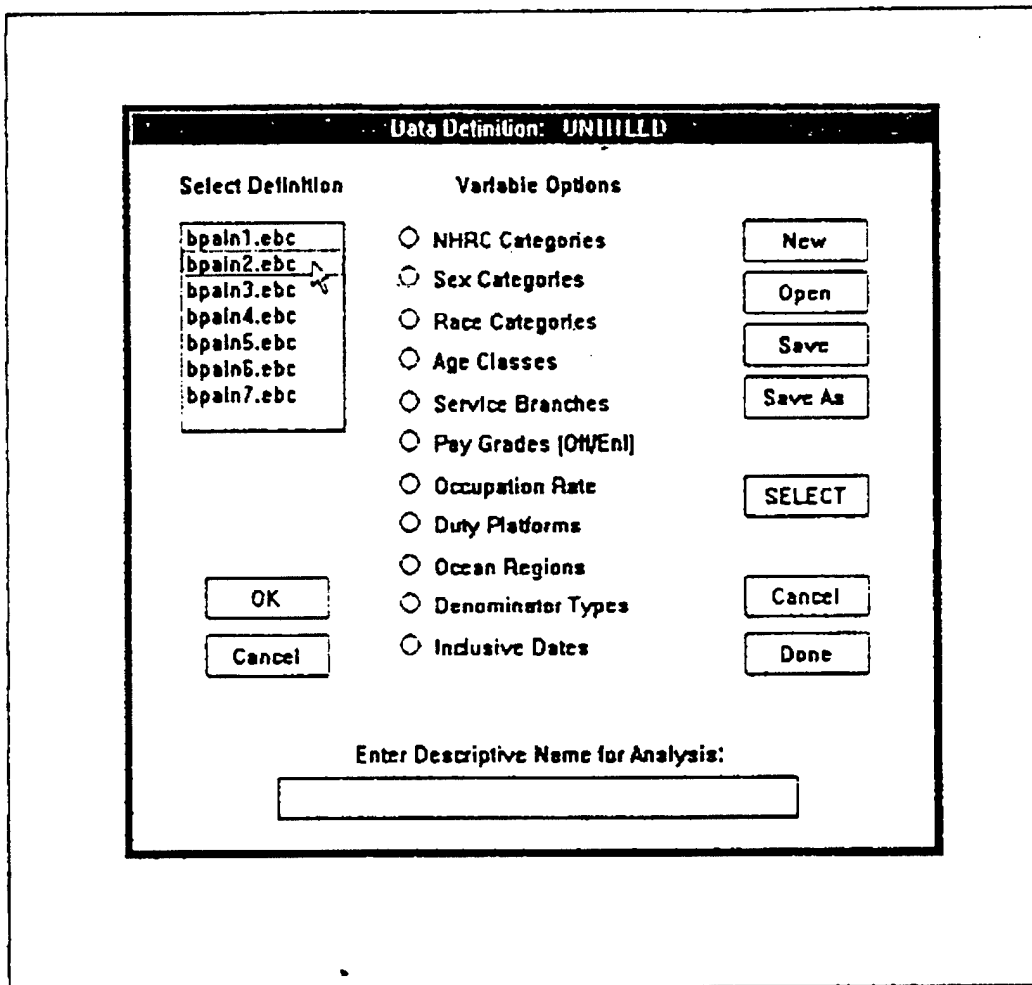


Figure 5. Data Definition Dialog-Existing Definition

TO ENTER DESCRIPTIVE NAME:

1. Enter description according to instructions in section 1.7

Description may consist of character, numbers, and embedded blanks.

TO MODIFY DEFAULT OR EXISTING DEFINITION:

1. Click one item from "Variable Options" list.
2. Click "SELECT."

The appropriate dialog appears. Instructions for each variable entry/modification procedure are given in sections 4.3.1 through 4.3.11.

3. On completion, click "SAVE" or "SAVE AS."

**Data Definition: UNTITLED**

**Variable Options**

- ☐ NHRC Categories
- ☐ Sex Categories
- ☐ Race Categories
- ☐ Age Classes
- ☐ Service Branches
- ☐ Pay Grades (OW/Enl)
- ☐ Occupation Rate
- ☐ Duty Platforms
- ☐ Ocean Regions
- ☐ Denominator Types
- ☐ Inclusive Dates

**Save Definition As**

\_\_\_\_\_

OK Cancel

**Enter Descriptive Name for Analysis:**

\_\_\_\_\_

New Open Save Save As SELECT Cancel Done

Figure 6. Data Definition Dialog-New Definition

**TO EXIT:**

1. To save selections, click "OK."
2. To reject selections, click "CANCEL."

If new or existing definition is active and not saved, a warning message appears giving the opportunity to save the definition before exiting.

### 4.3.1 NHRC Categories

When this option is selected, the dialog shown in Figure 7 appears.

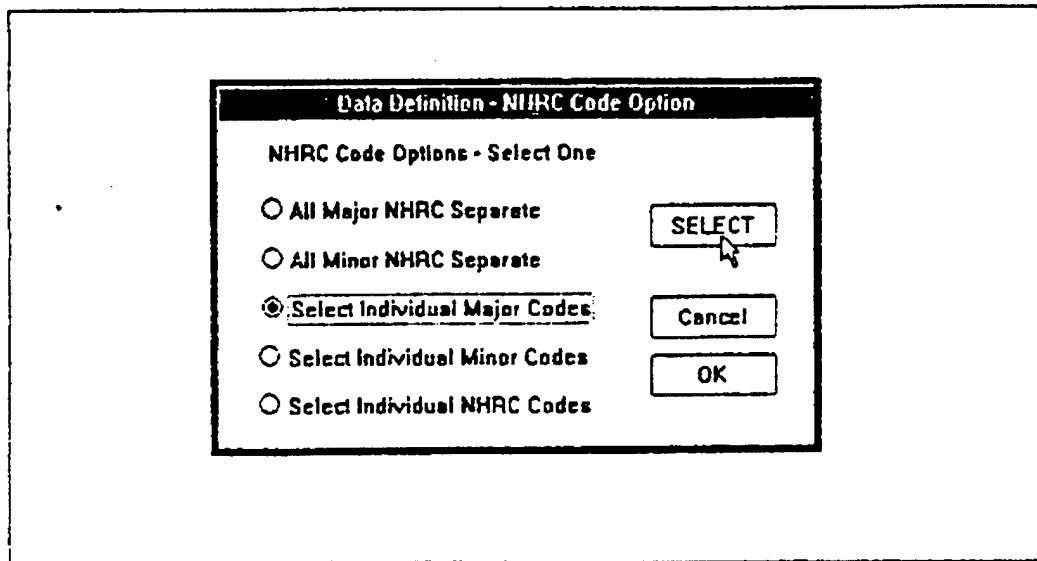


Figure 7. NHRC Category Selection Dialog

#### TO SELECT ALL MAJOR OR MINOR NHRC CATEGORIES:

1. For major categories, click "All Major NHRC Categories."
2. For minor categories, click "All Minor NHRC Categories."

See Technical Reference lists and definitions of major and minor NHRC categories.

#### TO SELECT INDIVIDUAL MAJOR CATEGORIES:

1. Click "Select Individual Major Codes."
2. Click "SELECT."
3. Follow instructions in section 4.3.1.1.

#### TO SELECT INDIVIDUAL MINOR CATEGORIES:

1. Click "Select Individual Minor Codes."
2. Click "SELECT."
3. Follow instruction in section 4.3.1.2.

TO SELECT INDIVIDUAL NHRC CODES:

1. Click "Select Individual NHRC Codes."
2. Click "SELECT."
3. Follow instructions in section 4.3.1.3.

TO EXIT:

1. To save selections, click "OK."
2. To reject selections, click "CANCEL."

#### 4.3.1.1 Select Individual Major Categories

When this option is selected, the dialog shown in Figure 8 appears.

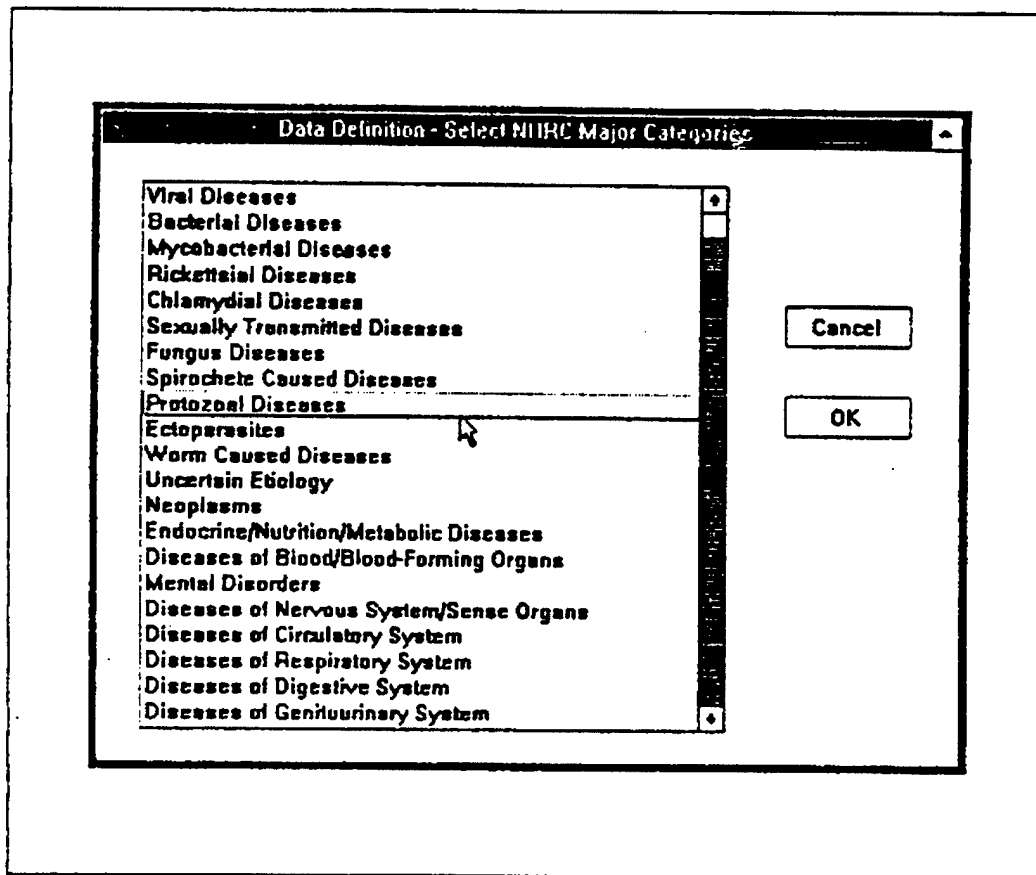


Figure 8. Major Category Selection Dialog

TO SELECT NHRC MAJOR CATEGORIES:

1. Select or de-select according to instructions in section 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

## 4.3.1.2 Select Individual Minor Categories

When this option is selected, the dialog shown in Figure 9 appears.

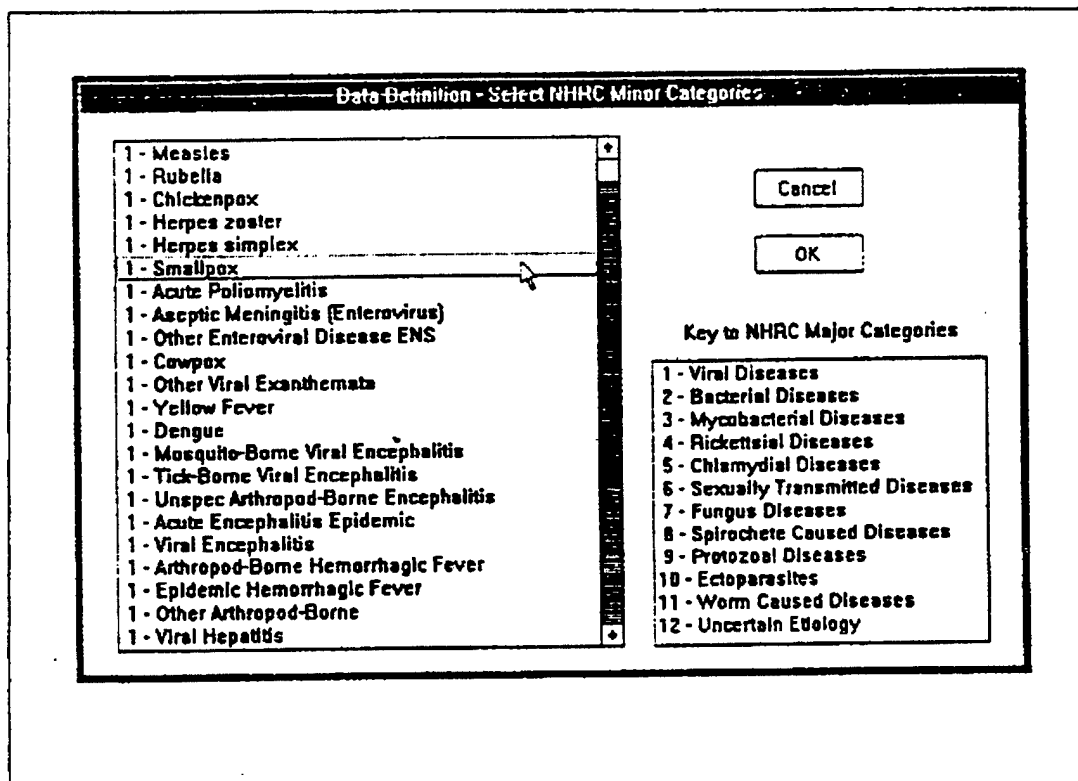


Figure 9. Minor Category Selection Dialog

TO SELECT NHRC MINOR CATEGORIES:

1. Select or de-select according to instructions in selection 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

## 4.3.1.3 Select Individual NHRC Categories

When this option is selected, the dialog shown in Figure 10 appears.

**Data Definition - Select NHRC Codes**

Enter NHRC Codes: Any Five Characters

11001	
11002	
11003	

Cancel

OK

Figure 10. Individual NHRC code Selection Dialog

TO SELECT INDIVIDUAL NHRC CODES:

1. Select or de-select according to instructions in section 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

### 4.3.2 Sex Categories

When this option is selected, the dialog shown in Figure 11 appears.

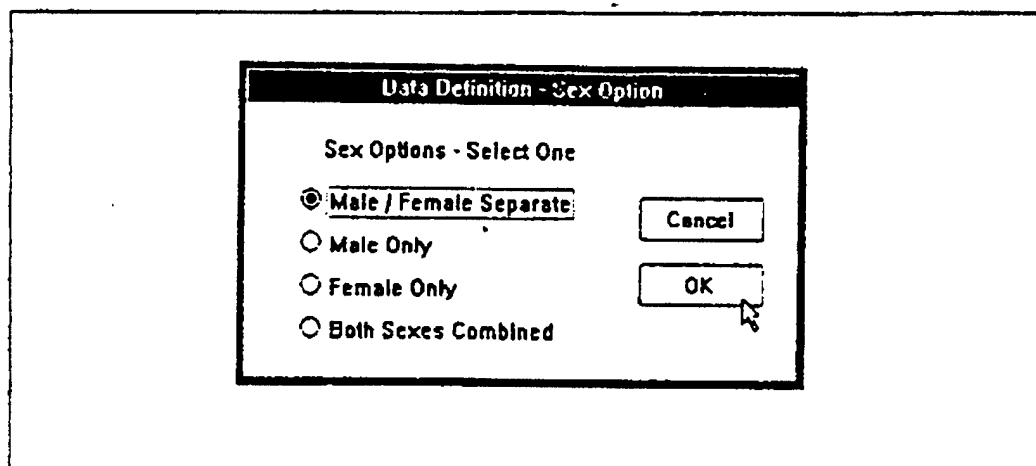


Figure 11. Sex Category Selection Dialog

#### TO SELECT SEX CATEGORY:

1. Select category according to instructions in section 1.7.
2. To exit and save selection, click "OK."
3. To exit and reject selection, click "CANCEL."

### 4.3.3. Race Categories

When this option is selected, the dialog shown in Figure 12 appears.

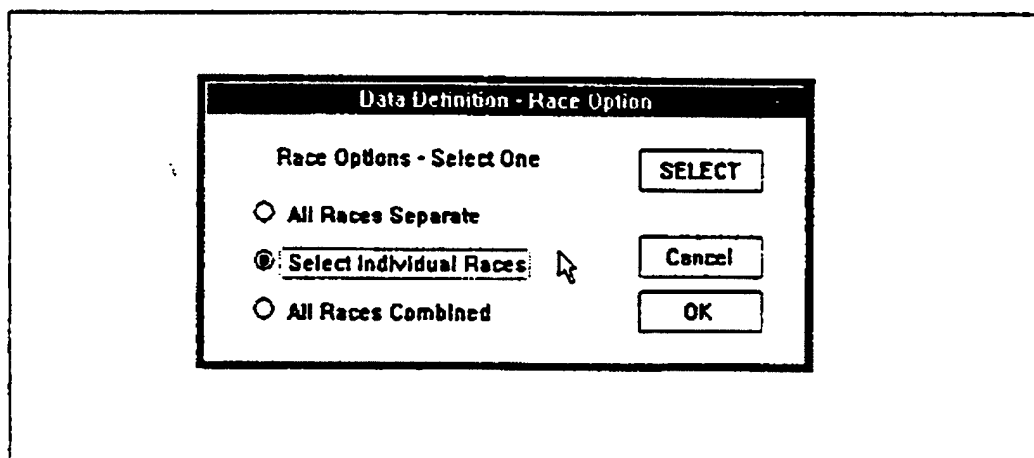


Figure 12. Race Category Selection Dialog

**TO SELECT RACE CATEGORY:**

1. Select category according to instructions in section 1.7.

2. For individual races, click "SELECT."

The individual Race dialog appears. Follow instructions below.

3. To exit and save selection, click "OK."

4. To exit and reject selection, click "CANCEL."

**TO SELECT INDIVIDUAL RACES (FIGURE 13):**

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK."

3. To exit and reject selections, click "CANCEL."

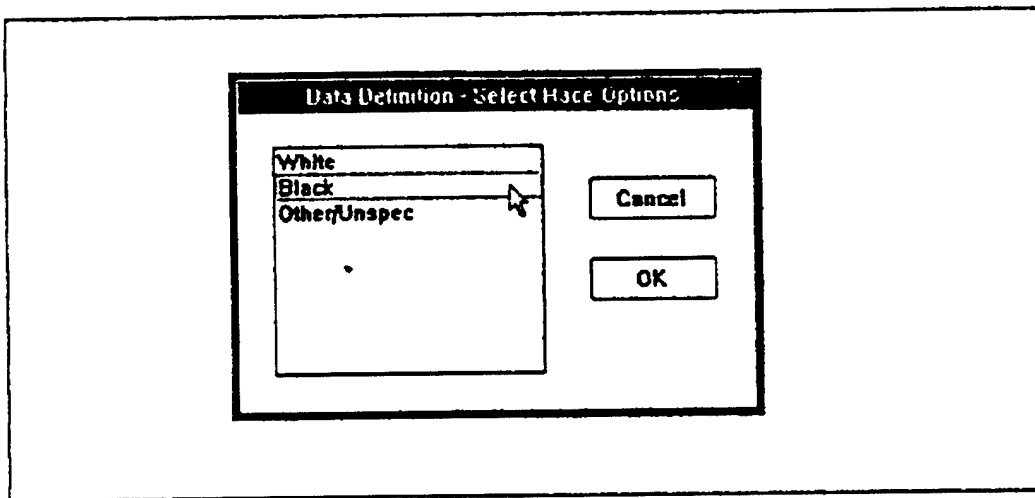


Figure 13. Individual Race Selection Dialog

#### 4.3.4 Age Classes

When this option is selected, the dialog shown in Figure 14 appears.

**TO SELECT AGE CLASS CATEGORY:**

1. Select category according to instructions in section 1.7.

2. For non-standard age classes, click "SELECT."

The non-standard age class dialog appears. Follow instructions below.

3. To exit and save selection, click "OK."
4. To exit and reject selection, click "CANCEL."

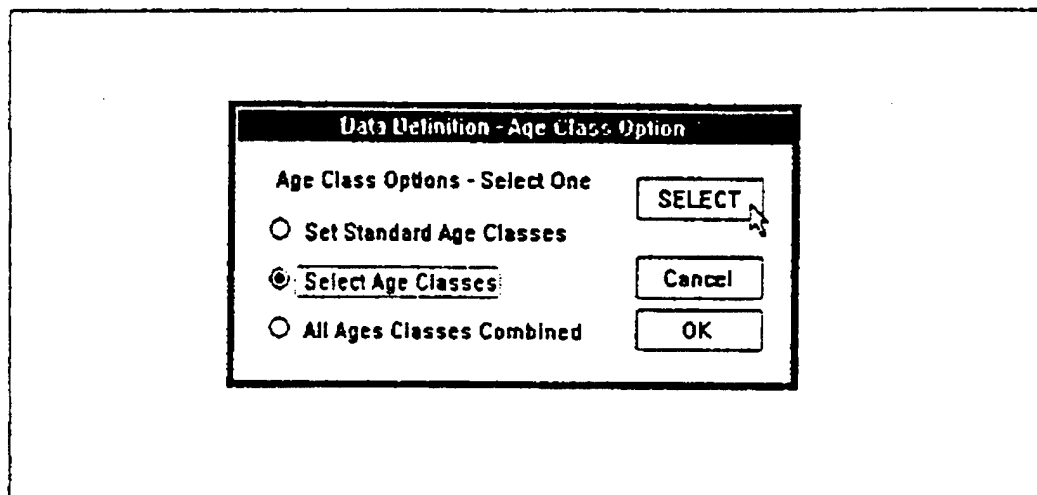


Figure 14. Age Class Selection Dialog

TO SELECT NON-STANDARD AGE CLASSES (FIGURE 15):

1. Enter beginning ages for each age class and the ending age for last class immediately after the last beginning age.
  2. Click "SHOW CLASSES."
- Full age class definitions appear (Figure 16).
3. To exit and save selections, click "OK."
  4. To exit and reject selections, click "CANCEL."

**Data Definition - Select NonStandard Age Classes**

	Class Start	Class Stop
Age Class 1:	<input type="text" value="17"/>	<input type="text"/>
Age Class 2:	<input type="text" value="20"/>	<input type="text"/>
Age Class 3:	<input type="text" value="25"/>	<input type="text"/>
Age Class 4:	<input type="text" value="30"/>	<input type="text"/>
Age Class 5:	<input type="text" value="35"/>	<input type="text"/>
Age Class 6:	<input type="text" value="40"/>	<input type="text"/>
Age Class 7:	<input type="text" value="45"/>	<input type="text"/>
Age Class 8:	<input type="text" value="50"/>	<input type="text"/>
Age Class 9:	<input type="text" value="55"/>	<input type="text"/>
Age Class 10:	<input type="text" value="60"/>	<input type="text"/>
Age Class 11:	<input type="text"/>	<input type="text"/>
Age Class 12:	<input type="text"/>	<input type="text"/>
.	<input type="text"/>	

Figure 15. Non-Standard Age Class Dialog-Initial

	Class Start	Class Stop
Age Class 1:	17	19
Age Class 2:	20	24
Age Class 3:	25	29
Age Class 4:	30	34
Age Class 5:	35	39
Age Class 6:	40	44
Age Class 7:	45	49
Age Class 8:	50	54
Age Class 9:	55	60
Age Class 10:		
Age Class 11:		
Age Class 12:		

Buttons: Show Classes, Cancel, OK

Figure 16. Non Standard Age Class Dialog-Final

#### 4.3.5 Service Branches

When this option is selected, the dialog shown in Figure 17 appears.

Service Branch Options - Select One

- ☐ Both Branches Separate
- ☒ US Navy Only
- ☐ US Marine Corps Only
- ☐ Both Branches Combined

Buttons: Cancel, OK

Figure 17. Service Branch Selection Dialog.

TO SELECT SERVICE BRANCH CATEGORY:

1. Select category according to instructions in section 1.7.
2. To exit and save selection, click "OK."
3. To exit and reject selection, click "CANCEL."

#### 4.3.6 Pay Grades

When this option is selected, the dialog shown in Figure 18 appears.

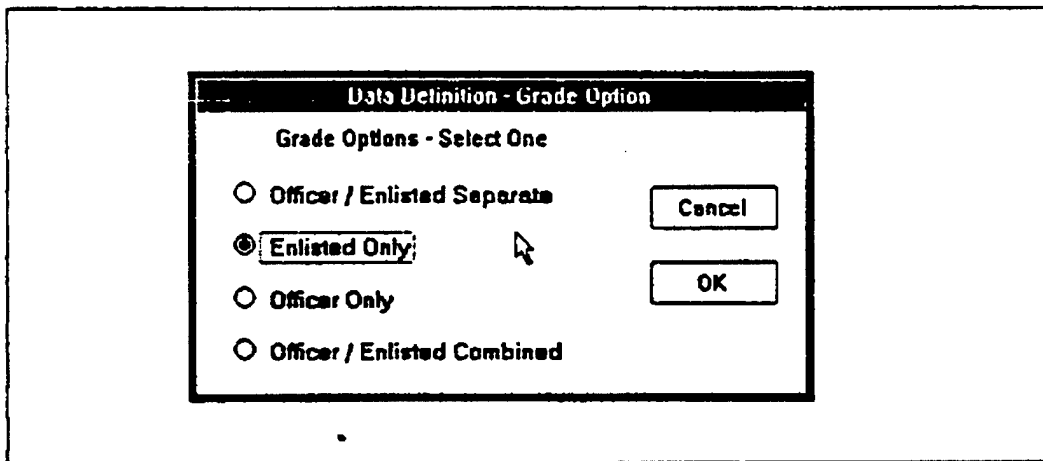


Figure 18. Pay Grade Selection Dialog

TO SELECT PAY GRADE CATEGORY:

1. Select category according to instructions in section 1.7.
2. To exit and save selection, click "OK."
3. To exit and reject selection, click "CANCEL."

#### 4.3.7 Occupation Rates

When this option is selected, the dialog shown in Figure 19 appears.

##### TO SELECT OCCUPATION RATE CATEGORY:

1. Select category according to instructions in section 1.7.
2. For individual occupation rates, click "SELECT."

The individual occupation rate dialog appears. Follow instructions below.

3. To exit and save selection, click "OK."
4. To exit and reject selection, click "CANCEL."

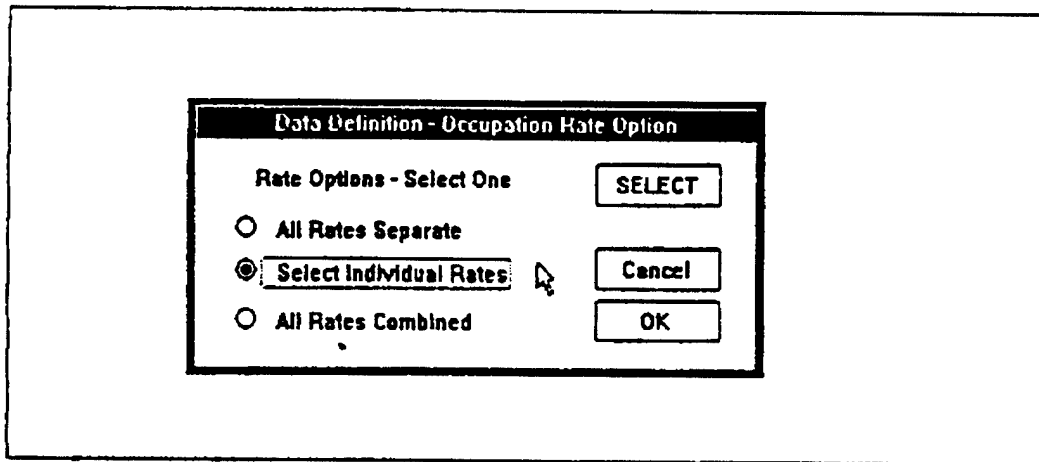


Figure 19. Occupation Rate Selection Dialog

##### TO SELECT INDIVIDUAL RATES (FIGURE 20):

1. Select or de-select according to instructions in section 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

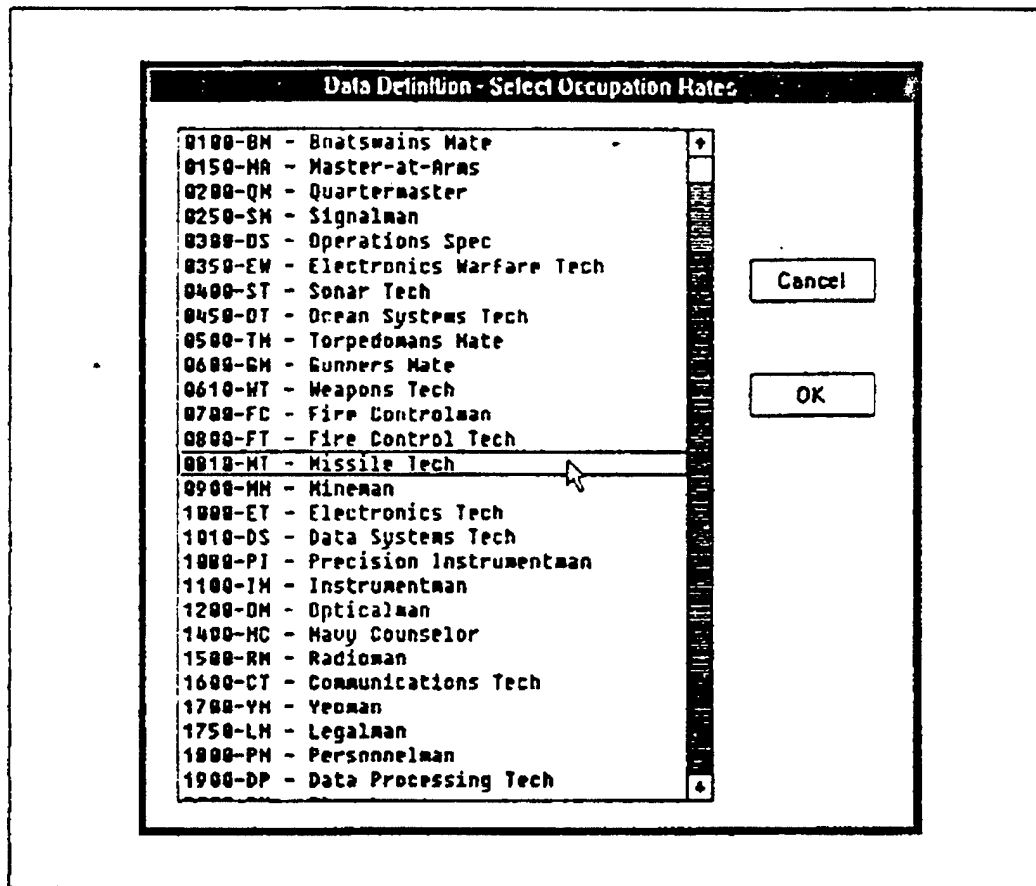


Figure 20. Individual Occupation Rate Selection Dialog.

#### 4.3.8 Duty Platform

When this option is selected, the dialog shown in Figure 21 appears.

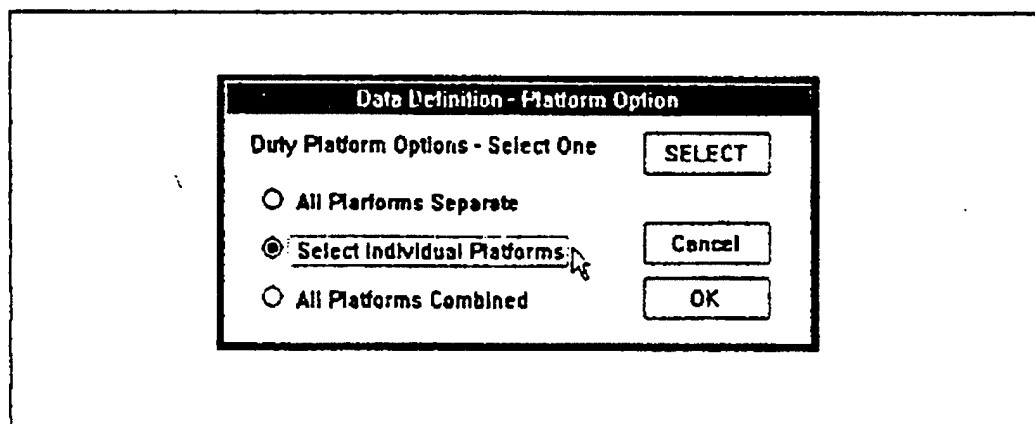


Figure 21. Duty Platform Selection Dialog

TO SELECT DUTY PLATFORM CATEGORY:

1. Select category according to instructions in section 1.7.
2. For individual duty platforms, click "SELECT."  
The individual duty platform dialog appears. Follow instructions below.
3. To exit and save selection, click "OK."
4. To exit and reject selection, click "CANCEL."

TO SELECT INDIVIDUAL DUTY PLATFORMS (FIGURE 22):

1. Select or de-select according to instructions in section 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

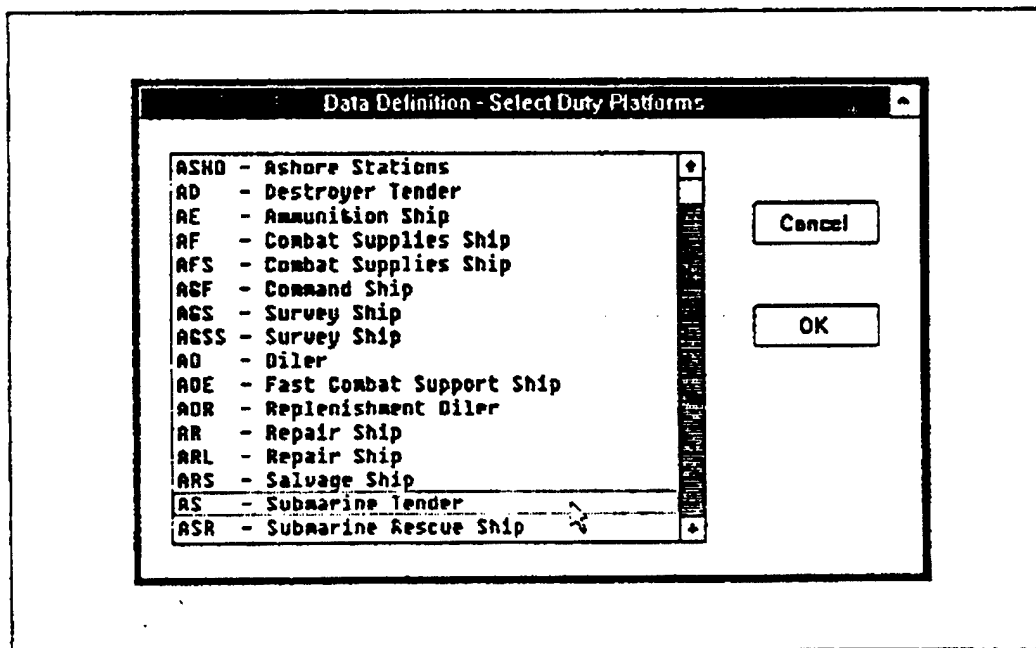


Figure 22. Individual Duty Platform Selection Dialog

#### 4.3.9 Ocean Region

When this option is selected, the dialog shown in Figure 23 appears.

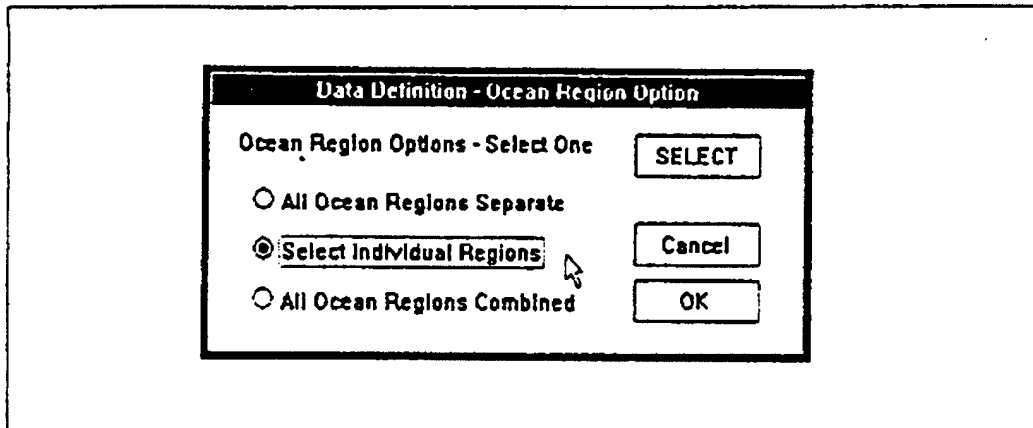


Figure 23. Ocean Region Selection Dialog.

#### TO SELECT OCEAN REGION CATEGORY:

1. Select category according to instructions in section 1.7.
2. For individual ocean, regions, click "SELECT."

The individual ocean region dialog appears. Follow instructions below.

3. To exit and save selection, click "OK."
4. To exit and reject selection, click "CANCEL."

#### TO SELECT INDIVIDUAL OCEAN REGIONS (FIGURE 24):

1. Select or de-select according to instructions in section 1.7.
2. To exit and save selections, click "OK."
3. To exit and reject selections, click "CANCEL."

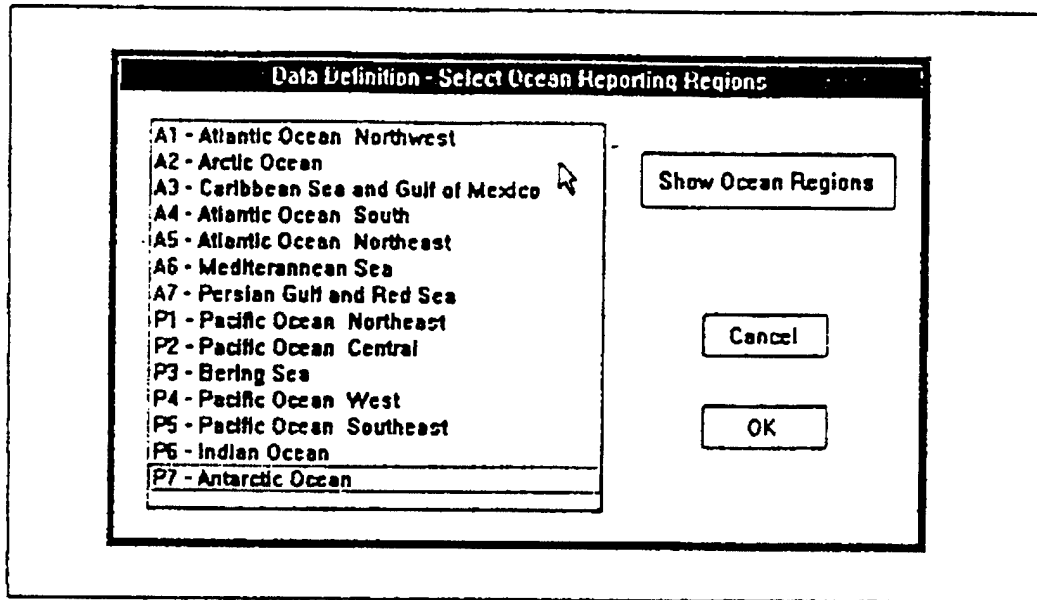


Figure 24. Individual Ocean Region Selection Dialog.

#### 4.3.10 Denominator Type

When this option is selected, the dialog shown in Figure 25 appears.

##### TO SELECT DENOMINATOR TYPE:

1. Select option according to instructions in section 1.7.
3. To exit and save selection, click "OK."
4. To exit and reject selection, click "CANCEL."

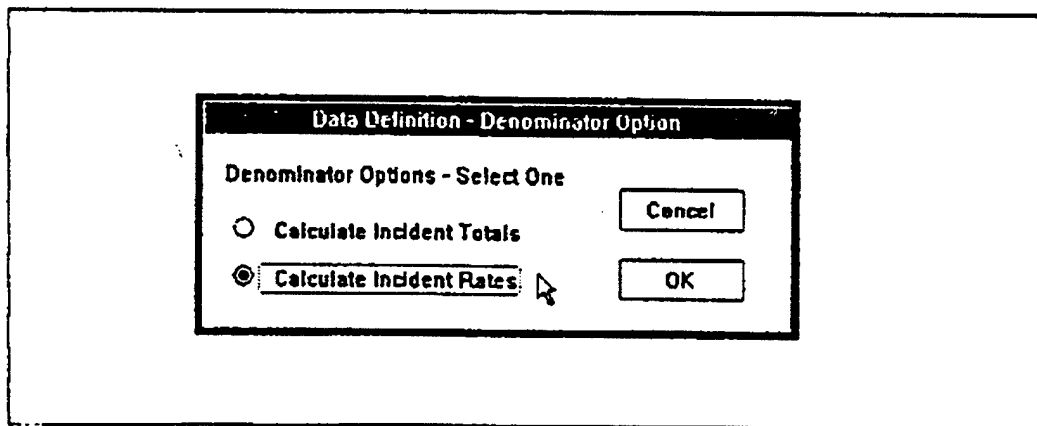


Figure 25. Denominator Type Selection Dialog.

#### 4.3.11 Inclusive Data

When this option is selected, the dialog shown in Figure 26 appears.

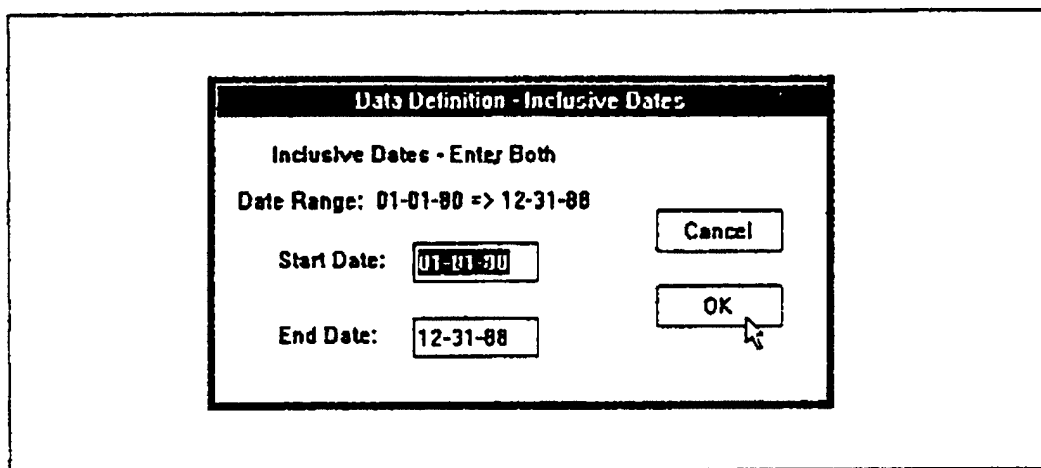


Figure 26. Inclusive Data Selection Dialog

#### TO ENTER DATES:

1. Enter dates according to instructions in section 1.7.  
Date format is MM-DD-YY.
2. To exit and save entries, click "OK."
3. To exit and reject entries, click "CANCEL."

#### 4.4 Extract Data

When this item is selected, the dialog shown in Figure 27 appears.

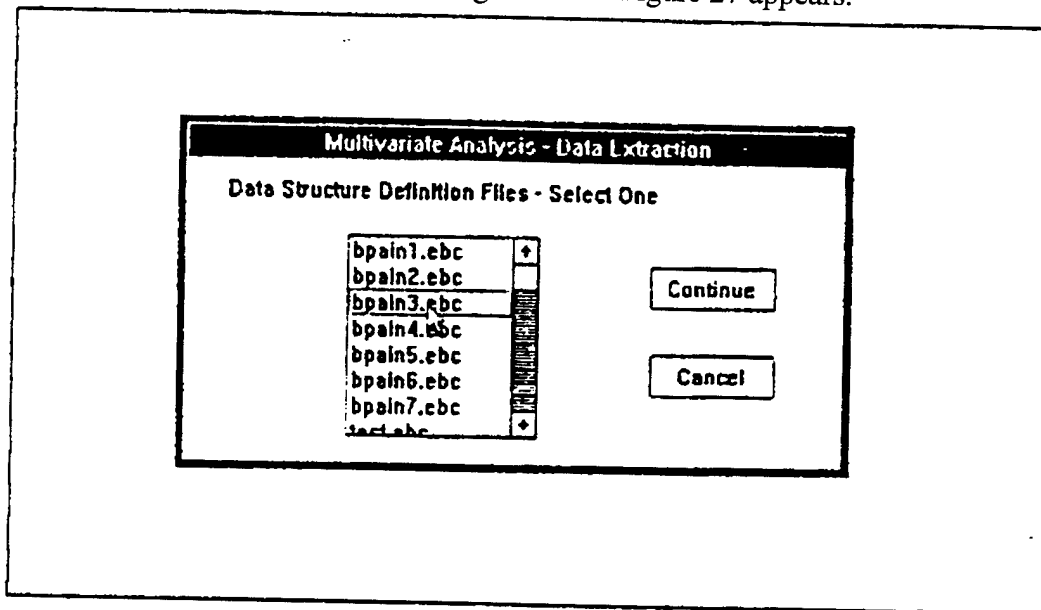


Figure 27. Data Extraction Dialog

#### TO SELECT DATA DEFINITION FOR EXTRACTION:

1. Click on the name of the desired definition.
3. To accept definition and perform extraction, click "CONTINUE."
4. To reject selection and return to EPISYS Desktop, click "CANCEL."

During data extraction, a screen appears showing the progress of the extraction. If no records are found that match the selected data structure definition, a message appears stating "NO CASES FOUND." In this instance, no further analysis is possible based on the selected definition.

## 4.5 Review Extraction

When this item is selected, the dialog shown in Figure 28 appears.

**Multivariate Analysis - Review Results**

**Time Series Options - Choose One**

☒ Raw Time Series      Raw Time Series: Start: 0 Stop: 365

☐ Spectral Density      Spectral Density: 2.0000 12.0000

**Text Report Files - Choose One**

bpain1.ebr  
bpain2.ebr  
bpain3.ebr  
bpain4.ebr  
bpain5.ebr  
bpain6.ebr  
bpain7.ebr

Screen      Printer      Graphic      Done

Figure 28. Review Extraction Dialog

TO VIEW EXTRACTION TEXT REPORT (Figure 29):

1. Select available report according to instructions in section 1.7.
2. To display on screen, click "SCREEN."
3. To send report to printer, click "PRINTER."

TO VIEW RAW TIME SERIES (Figure 30):

1. Click "Raw Time Series."
2. Enter "Start" and "Stop" days according to instructions in section 1.7.  
Day zero is the first day entered in "Inclusive Dates" (section 4.3.11).
3. Click "Graphic."



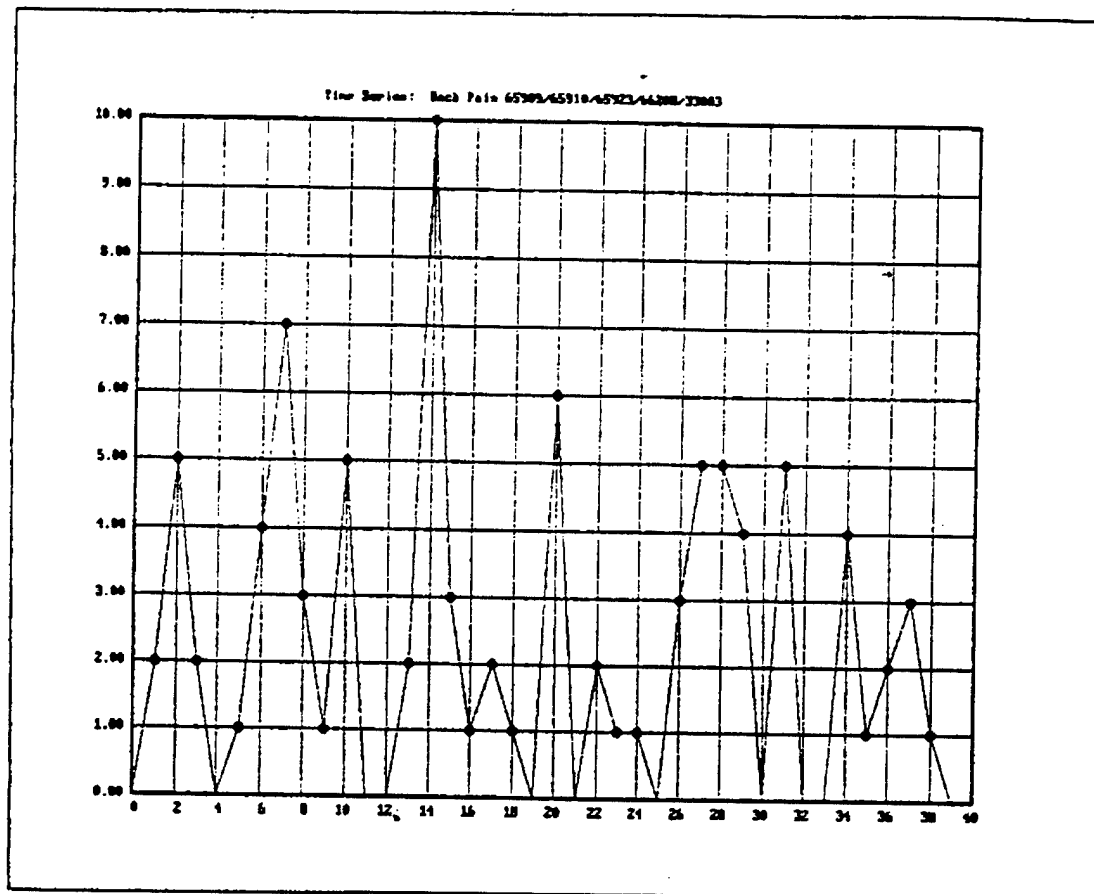


Figure 30. Data Extraction Raw Time Series

TO VIEW SPECTRAL DENSITY ANALYSIS (Figure 31):

1. Click "Spectral Density."
2. Enter "START" and "STOP" days according to instructions in section 1.7.  
Day zero is the first day entered in "Inclusive Dates" (section 4.3.11).
4. Click "GRAPHIC."

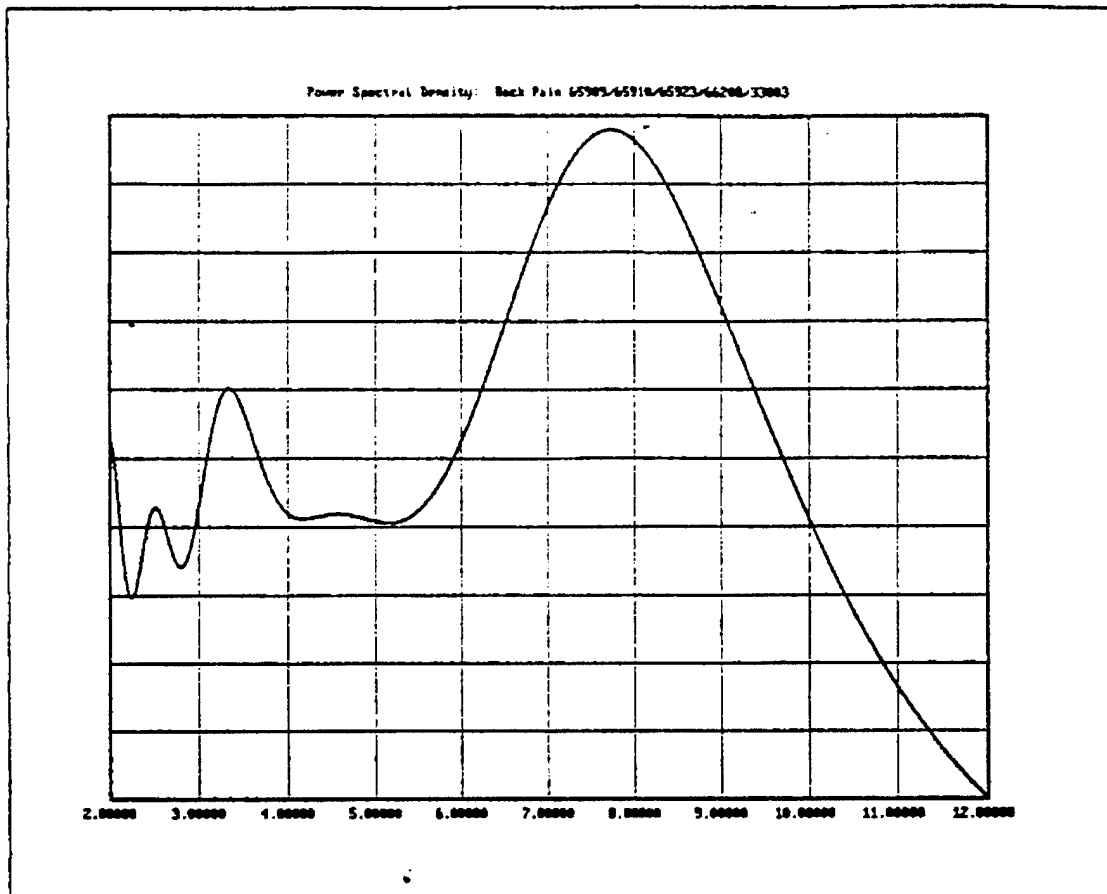


Figure 31. Data Extraction Spectral Density Analysis

TO EXIT:

1. To exit and return to EPISYS Desktop, click "DONE."

4.6 Perform Analysis

When this item is selected, the dialog shown in Figure 32 appears.

TO SELECT A DATA DEFINITION FOR ANALYSIS:

1. Select an available definition according to instructions in section 1.7.
3. To accept definition and perform extraction, click "CONTINUE."
4. To reject definition and return to EPISYS Desktop, click "CANCEL."

During data analysis, a screen appears showing the progress of the analysis and any errors that might occur.

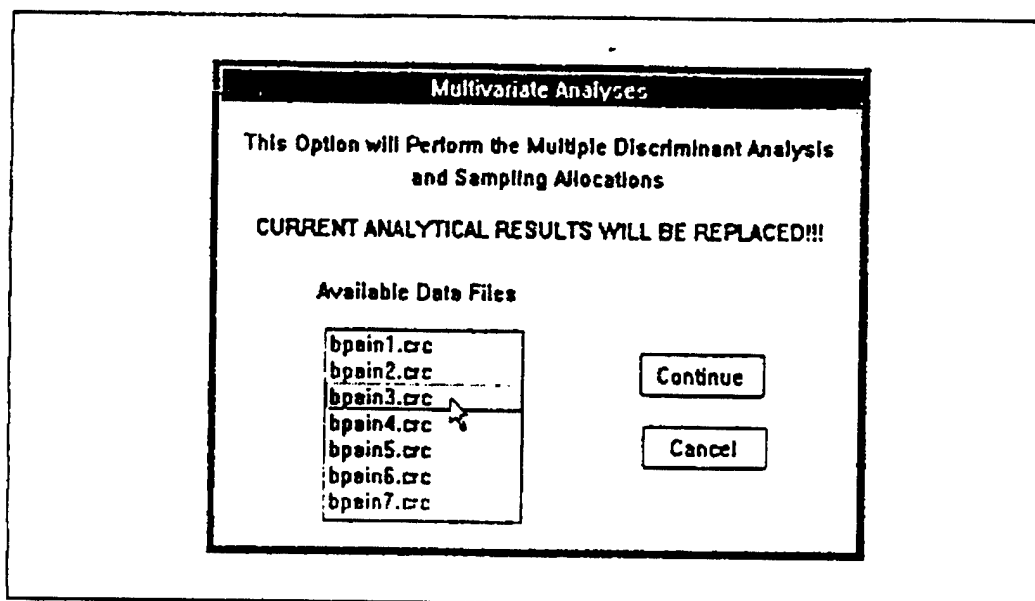


Figure 32. Perform Analysis Dialog

#### 4.7 Review Analysis

When this item is selected, the dialog shown in Figure 33 appears.

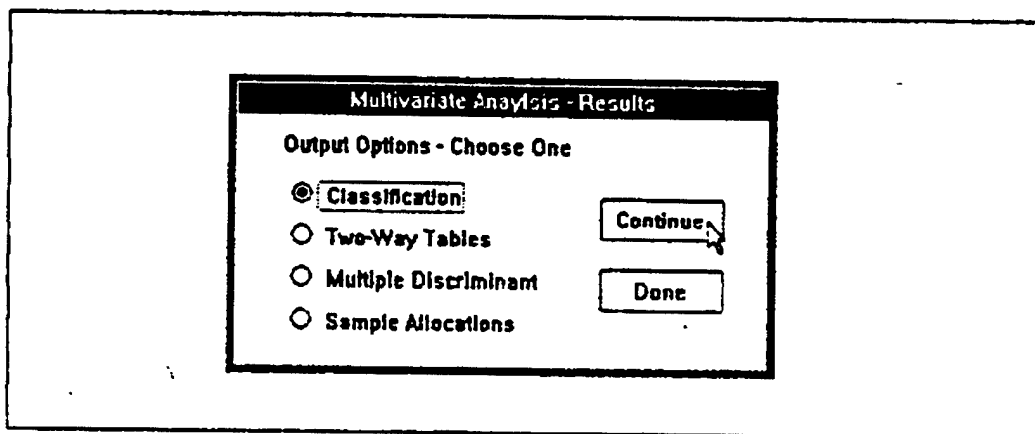


Figure 33. Review Analysis Dialog

#### TO REVIEW ANALYTICAL RESULTS:

1. For dendrograms, click "Classification," then click "CONTINUE."

2. For two-way tables, click 'Two-Way Tables,' then click "CONTINUE."
3. For the multiple discriminant results, click "Multiple Discriminant," then click "CONTINUE."
4. For sample stratification and sizes, click "Sample Allocations," then click "CONTINUE."
5. To exit and return to EPISYS Desktop, click "DONE."

#### 4.7.1 Classifications

When this option is selected, the dialog shown in the Figure 34 appears.

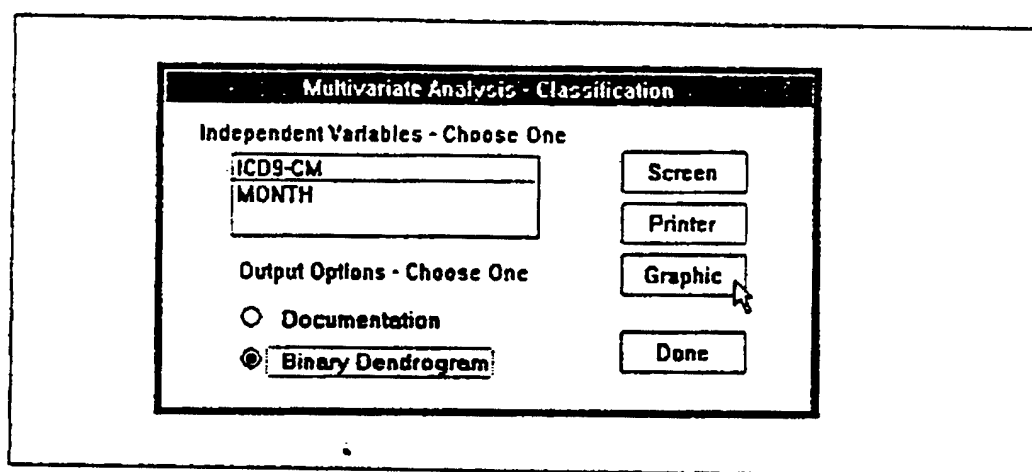


Figure 34. Review Classification Dialog

#### TO VIEW BINARY DENDROGRAM TECHNICAL DOCUMENTATION (Figure 35):

1. Click "Documentation."
2. To display text report on screen, click "SCREEN."
3. To send text report to printer, click "PRINTER."
4. To exit and return to Review Analysis Dialog, click "DONE."

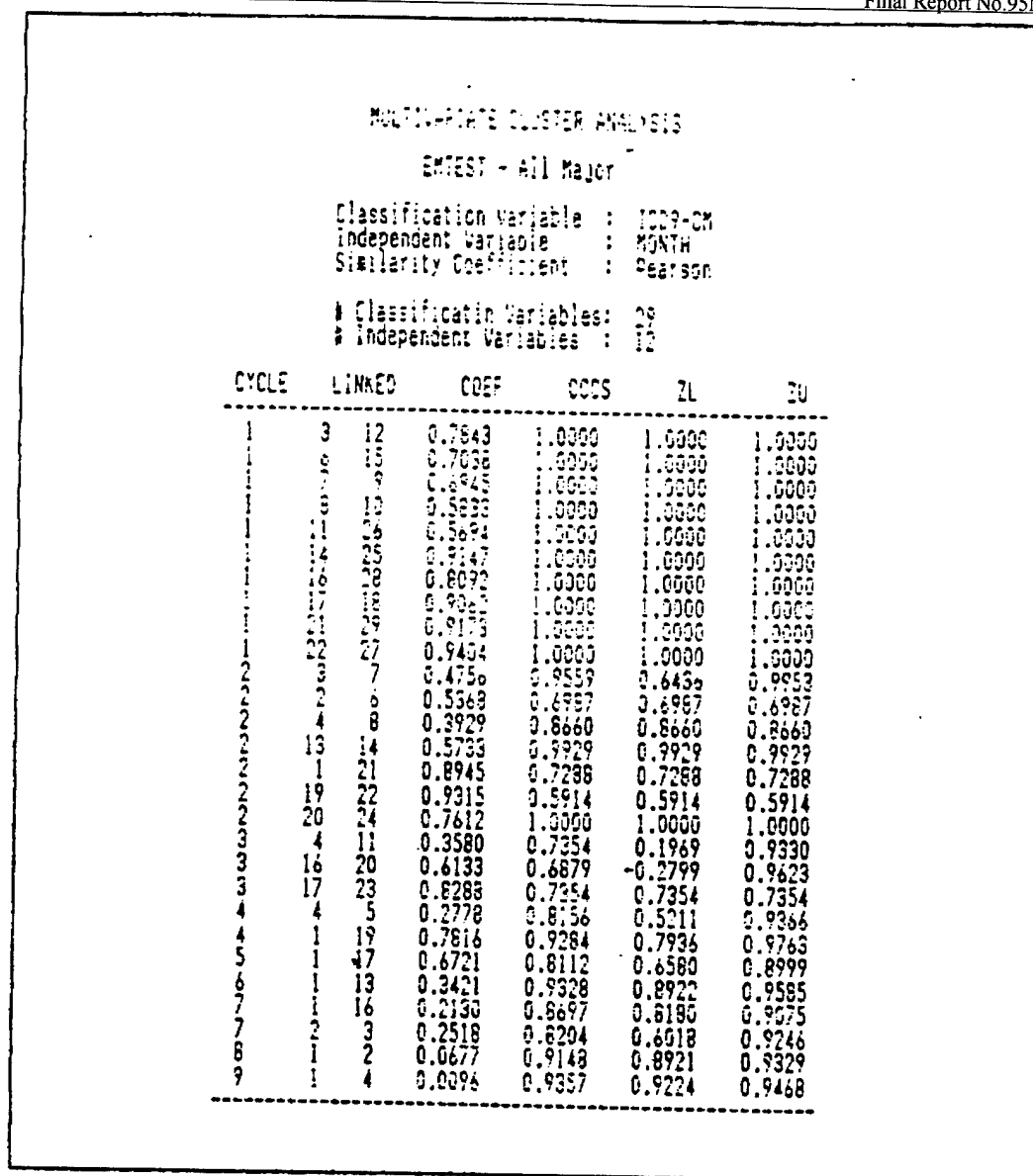


Figure 35. Binary Dendrogram Technical Documentation

TO VIEW BINARY DENDROGRAM (Figure 36):

1. Click "Binary Dendrogram."
2. Select an ancillary variable according to instructions in section 1.7.
3. To display dendrogram on screen, click "SCREEN."
4. To send dendrogram to printer, click "PRINTER."

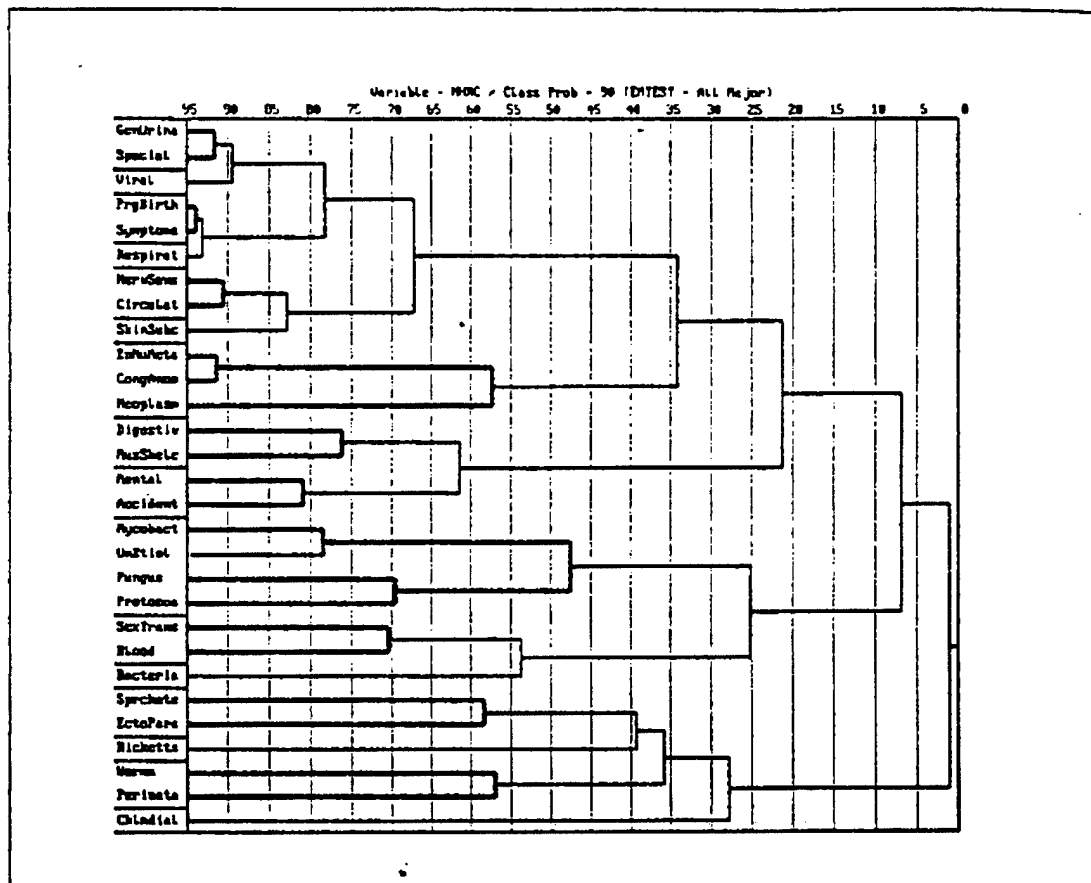


Figure 36. Binary Dendrogram.

TO EXIT:

1. To exit and return to the Review Analysis Dialog, click "DONE."

## 4.7.2 Two-Way Tables

When this option is selected, the dialog shown in Figure 37 appears.

TO REVIEW TWO-WAY TABLES (Figure 38):

1. Select ancillary variable according to instructions in section 1.7.
2. Select type of table according to instructions in section 1.7.
3. To display two-way table on screen, click "SCREEN."

4. To send two-way table to printer, click "PRINTER."
5. To exit and return to Review Results Dialog, click "DONE."

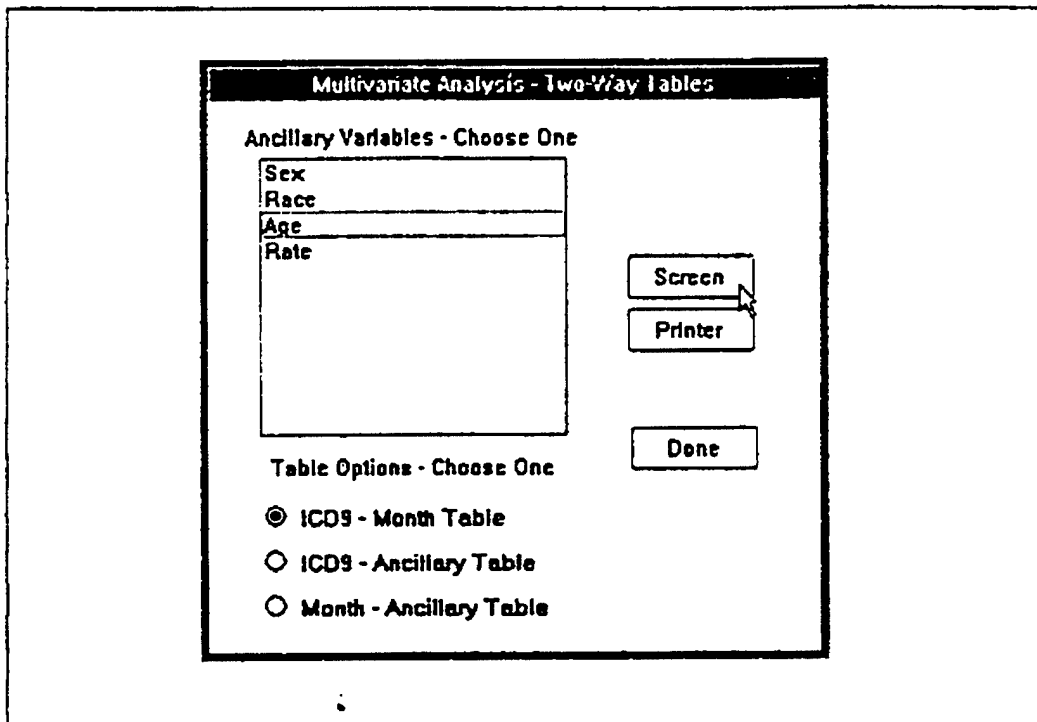


Figure 37. Two-Way Table Dialog.

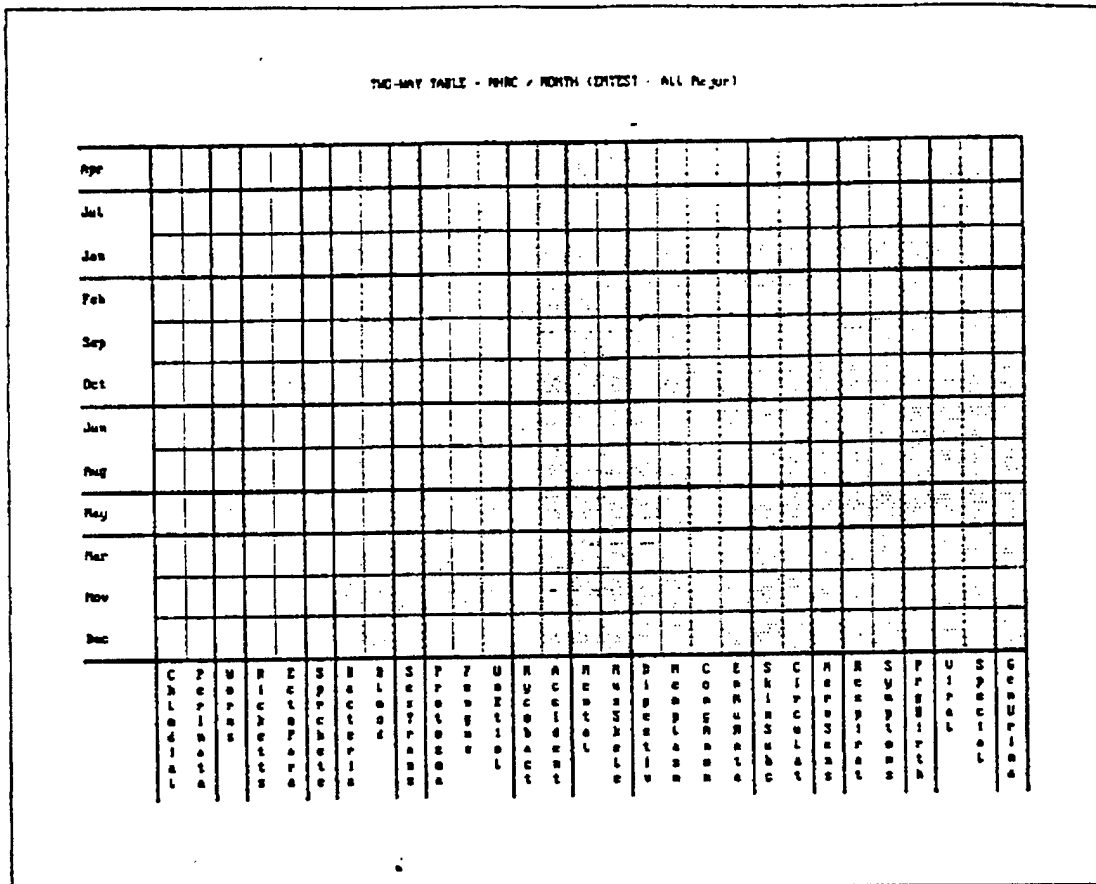


Figure 38. Two-Way Table.

### 4.7.3 Multiple Discriminant

When this option is selected, the dialog shown in Figure 39 appears.

TO VIEW MULTIPLE DISCRIMINANT RESULTS (Figures 40 and 41).

1. Select ancillary variables according to instructions in section 1.7.
2. To display text report on screen, click “SCREEN.”
3. To send text report to the printer, click “PRINTER.”
4. To plot results on screen, click “GRAPHIC.”
5. To exit and return to Review Analysis Dialog, click “DONE.”

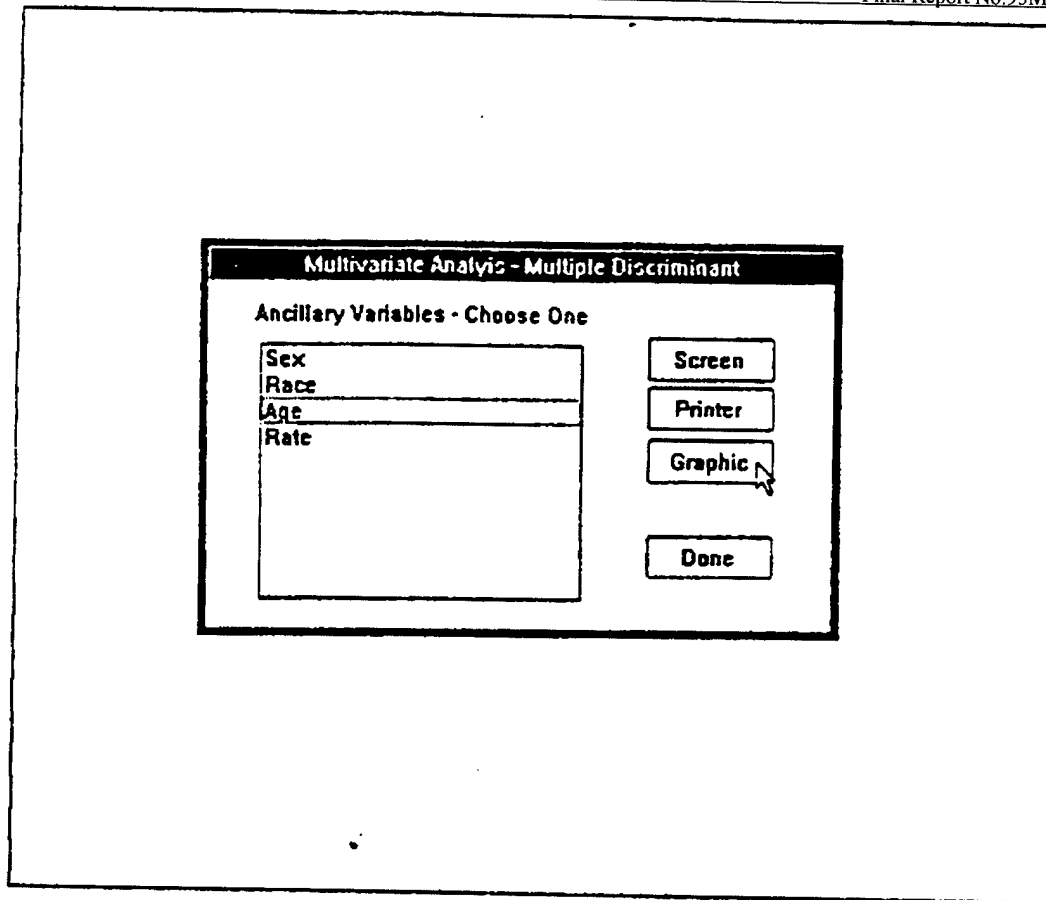


Figure 39. Multiple Discriminant Dialog

MULTIVARIATE STRATIFICATION			
EMTEST - All Major			
Total Sample Size: 992			
=====			
Variable - Sex			
Stratum Definition	Proportion	Sample Size	
Stratum 1: Female	1.701e-02	17	
Stratum 2: Male	9.830e-01	975	
=====			
Variable - Race			
Stratum Definition	Proportion	Sample Size	
Stratum 1: White	1.000e+00	992	
Black			
Other			
=====			
Variable - Age			
Stratum Definition	Proportion	Sample Size	
Stratum 1: 25-29	4.174e-01	414	
30-34			
35-39			
Stratum 2: 17-19	5.826e-01	578	
20-21			
22-24			
40-44			
45-61			
=====			
Variable - Rate			
Stratum Definition	Proportion	Sample Size	
Stratum 1: 8000-HM	1.495e-01	148	
Stratum 2: 1500-RM	3.972e-02	39	
Stratum 3: 1700-YN	2.135e-02	21	
Stratum 4: 2000-SK	1.249e-02	12	
Stratum 5: 1800-PH	2.077e-02	21	
1600-CT			
8300-DT			
7300-AK			
Stratum 6: 1900-DP	2.079e-03	2	
Stratum 7: 7400-AZ	3.562e-03	4	
6600-AC			
2100-DK			
Stratum 8: 7600-PH	4.496e-04	0	
=====			
Stratum 9: 0450-DT	1.303e-03	1	
7100-AG			
1400-NC			
7200-TD			
2500-RP			
2600-JO			
Stratum 10: 1750-LN	3.153e-05	0	
Stratum 11: 3100-LI	7.432e-05	0	
1200-DM			
3200-DM			
4500-DC			
1650-PI			
Stratum 12: 3600-SN	7.487e-01	743	
7300-AN			
3700-MM			
5000-FM			
2200-MS			
6900-AM			
4300-HT			
1000-ET			
4000-BT			
0100-BM			
4100-EM			
0300-OS			
6200-AD			
3800-EN			
6300-AT			
6500-AO			
0600-GM			
6700-AB			
0400-ST			
6800-AE			
2490-SH			
4200-IC			
0800-FI			
0200-QM			
0500-TM			
0250-SM			
5600-BU			
5500-CM			
6310-AX			
5300-CE			
0810-MT			
5800-UT			
2700-PC			
5700-SW			
6180-AV			
4700-ML			
5380-EQ			
5080-CU			
5280-UC			
=====			

Figure 40. Multiple Discriminant Technical Text Report

Discriminant Confidence: Bayesian First Two Axes (Apt)  
Follows Variable: Discriminant Classes  
As: Discriminant Transformation for Class Definition

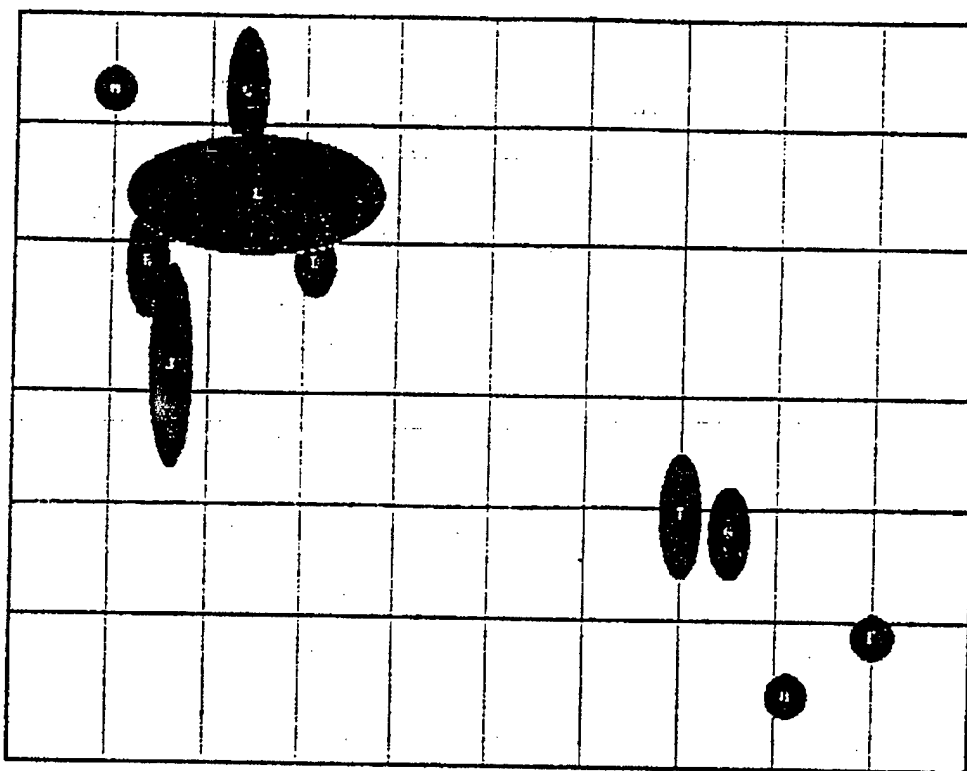


Figure 41. Multiple Discriminant Graphic Output.

#### 4.7.4 Sample Allocation

When this option is selected, the dialog shown in Figure 42 appears.

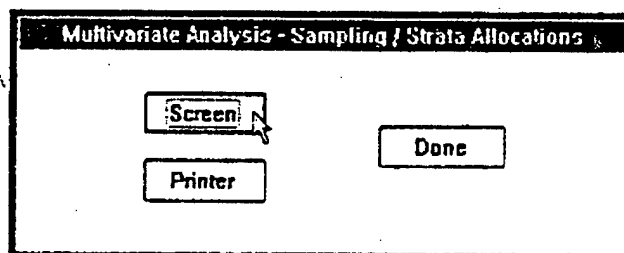


Figure 42. Sample Allocation Dialog.

TO VIEW SAMPLE STRATIFICATION AND ALLOCATION (Figures 43 and 44).

1. To display text report on screen, click "SCREEN."
2. To send text report to printer, click "PRINTER."
3. To exit and return to Review Analysis Dialog, click "DONE."

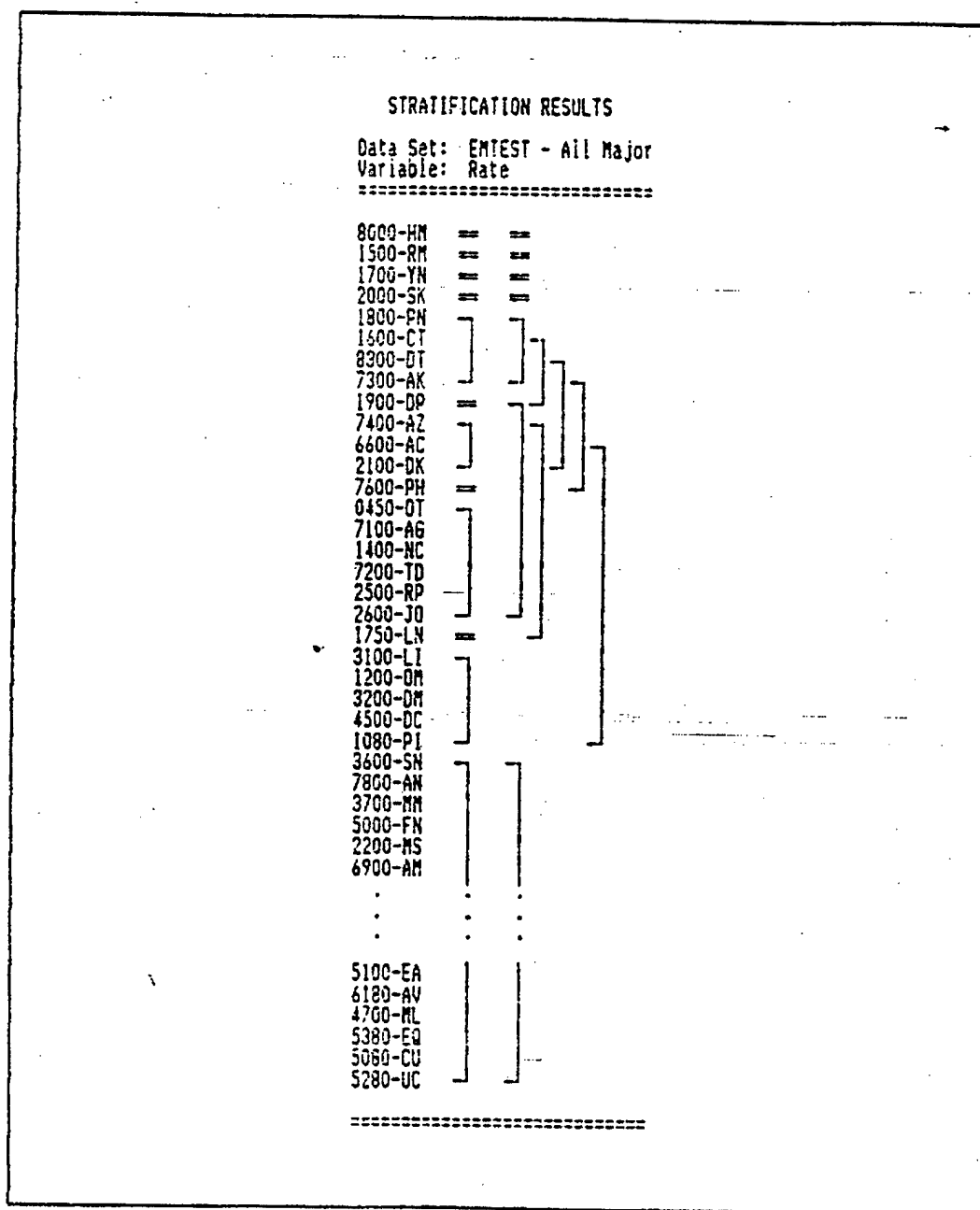


Figure 43. Sample Stratification.

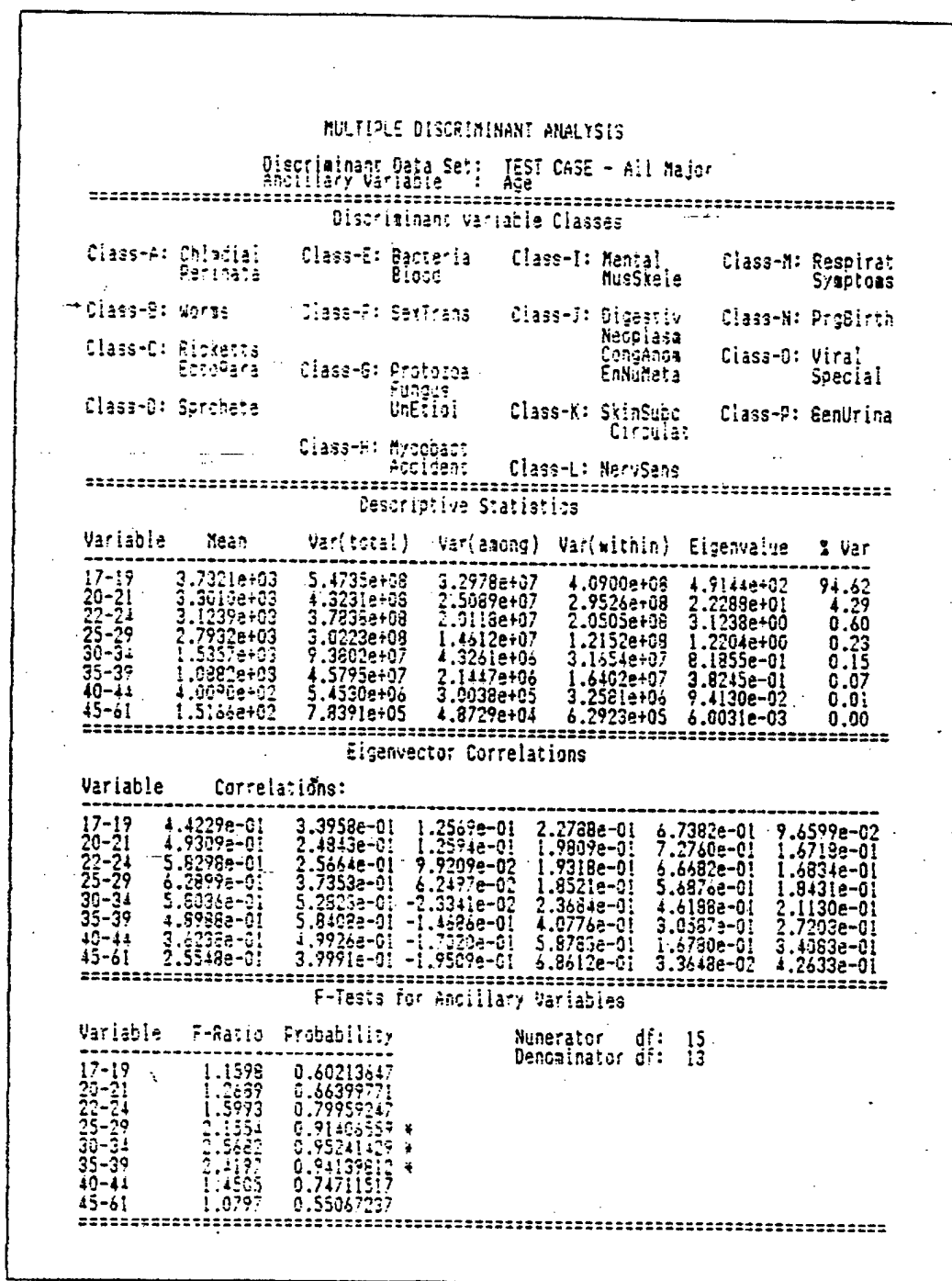


Figure 44. Sample Allocation Technical Text Report.

## 5.0 UNIVARIATE OPTION

### 5.1 Overview

The univariate option performs analyses based on single NHRC major or minor categories or individual NHRC diagnosis/classification codes. Analyses include:

- Incidence frequencies tabulated by independent ancillary variables sex, race, age, branch, grade, occupation, duty platform, and ocean region;
- Frequency, rate, age-adjusted, and standard rate data summaries based on one-, two-, and three-level cross-tabulations of the independent ancillary variables listed above; and
- Raw time series and spectral density analysis.

There are six sub-menu items under Univariate Analysis. Note that for a completely new univariate analysis, each menu item must be completed in order. If this is not done, unexpected results could occur. If an option is selected that requires the results of a previous analysis and that analysis has not been performed, a warning message appears with information on how to remedy the error. Each menu item is described in subsequent sections.

#### 5.2 Select Univariate Options

See section 4.2 "Select Multivariate Options" for complete instructions.

#### 5.3 Define Data Structure

See section 4.3 "Define Data Structure" for complete instructions.

#### 5.4 Extract Data

See section 4.4 "Extract Data" for complete instructions.

#### 5.5 Review Extraction

See section 4.5 "Review Extraction" for complete instructions.

#### 5.6 Select Data Structure

When this item is selected, the dialog shown in Figure 45 appears. This dialog is used to select the data structure definition that will be used in the univariate data summary calculations.

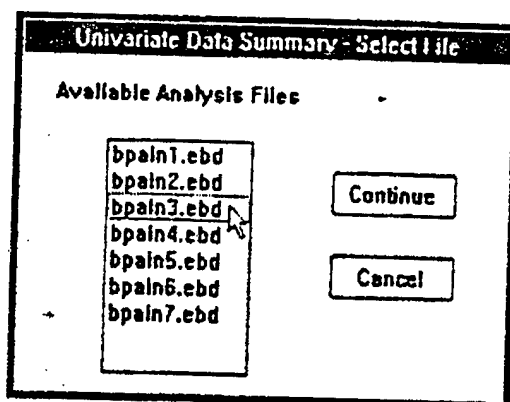


Figure 45. Select Data Definition Dialog.

TO SELECT AVAILABLE DATA STRUCTURE DEFINITION:

1. Select available definition according to instructions in section 1.7.
2. To accept and return to Desktop, click "CONTINUE."
3. To reject and return to EPISYS Desktop, click "CANCEL."

5.7 Calculate Data Summary

When this item is selected, the dialog shown in Figure 46 appears.

TO CALCULATE DATA SUMMARY (Figure 47):

1. Select Independent variable effects according to the instructions in section 1.7.
2. Click "CALCULATE."

The bar at the bottom of dialog tracks progress of calculations.

3. To view data summary on screen, click "SCREEN."
4. To send data summary to printer, click "PRINTER."
5. Repeat steps 1 through 4 as required.
6. To exit and return to EPISYS Desktop, click "DONE."

**Univariate Analysis - Data Effects Summary**

Variables / Levels	Independent Variable Effect Choice List
<b>A - Sex</b> 1 - Male 2 - Female	Sex Race Age Rate
<b>B - Race</b> 1 - White 2 - Black 3 - Other	Sex - Race Sex - Age Sex - Rate Race - Age
<b>C - Age</b> 1 - 17-19 2 - 20-21 3 - 22-24 4 - 25-29 5 - 30-34 6 - 35-39 7 - 40-44 8 - 45-61	Race - Rate Age - Rate Sex - Race - Age Sex - Race - Rate Sex - Age - Rate Race - Age - Rate
<b>D - Rate</b> 1 - 0100-BM 2 - 0150-MA 3 - 0200-QM 4 - 0250-SH 5 - 0300-OS 6 - 0350-EV 7 - 0400-ST	

**CALCULATE**

**Screen**

**Printer**

**Done**

0% **CALCULATING - Percent Completed** 100%

Figure 46. Data Summary Dialog.

UNIVARIATE DATA SUMMARY										
Back Pain 66208										
		Number of Cases :		5607						
		Person-Days at Risk:		4461376						
		Rate (per 100000) :		125.679						
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Figure 47. Data Summary Text Report.

## 6.0 LIMITS OPTION

### 6.1 Overview

The limits item performs moving average limit detection analyses on each NHRC major and minor category. The purpose of the analyses is to define time intervals during which the moving average for any category moves outside of local or global confidence limits.

There are two sub-menu items under Limits Analysis. Note that, whenever the CDF file has newly installed or updated, the first time item (Perform Analysis) must be performed before the second item (Review Results) can be selected. If the second item is chosen prematurely, a warning message appears with the information on how to remedy the error. Both menu items are described in subsequent sections.

### 6.2 Perform Analysis

When this item is selected, the dialog shown in Figure 48 appears.

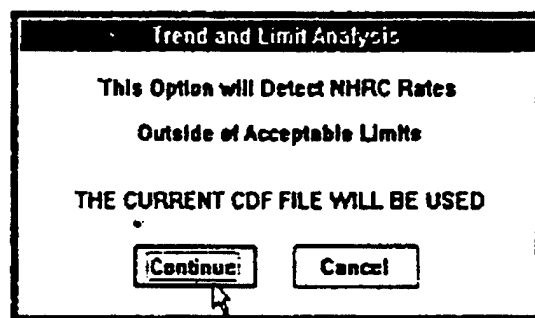


Figure 48. Perform Analysis Dialog.

#### TO PERFORM LIMITS ANALYSIS:

1. To perform analysis, click "CONTINUE."
2. To abort and return to EPISYS Desktop, click "CANCEL."

During the analysis, a screen appears that tracks progress of the analysis.

### 6.3 Review Results

When this option is selected, the dialog shown in Figure 49 appears.

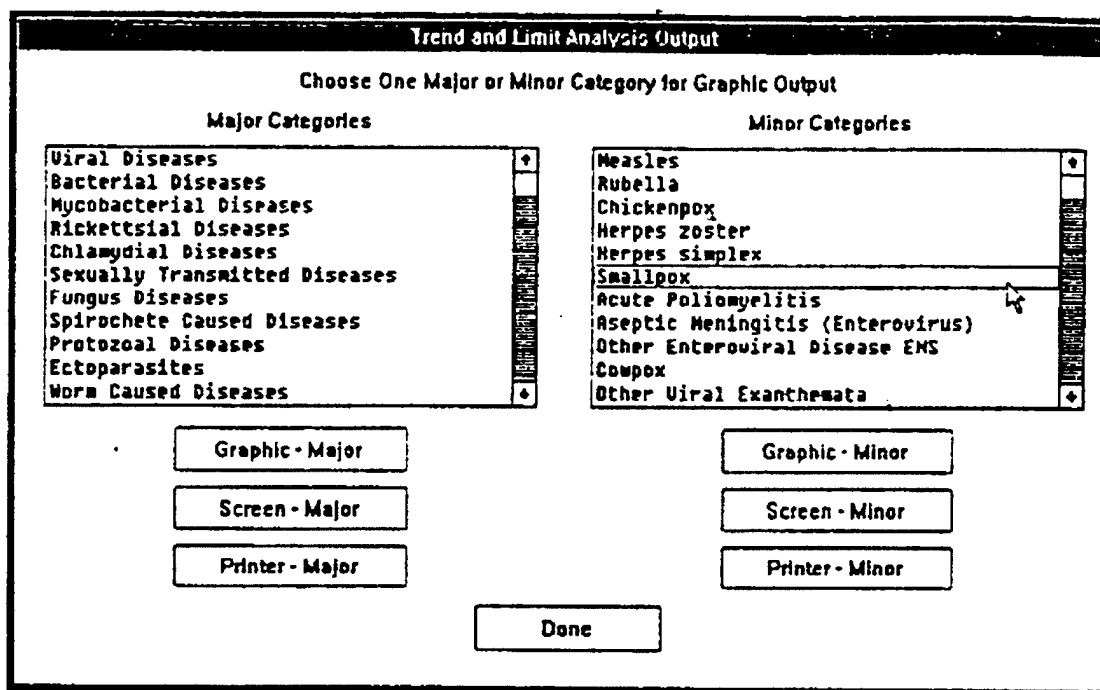


Figure 49. Review Analysis Dialog

TO VIEW TEXT REPORTS (Figure 50):

1. For text report on major categories:
  - 1a. To display report on screen, click "SCREEN-MAJOR."
  - 1b. To send report to printer, click "PRINTER-MAJOR."
2. For text report on minor categories:
  - 2a. To display report on screen, click "SCREEN-MINOR."
  - 2b. To send report to printer, click "PRINTER-MINOR."

## LIMIT REPORTS - Major Categories (per 100,000 Person-days)

## Viral Diseases

Feb 1982	BELOW Local	Confidence Region	-4.7632
Mar 1982	BELOW Local	Confidence Region	-7.3240
Apr 1982	BELOW Local	Confidence Region	-11.4054
May 1982	BELOW Local	Confidence Region	-2.0575
Jan 1983	BELOW Local	Confidence Region	-1.4866
Feb 1983	BELOW Local	Confidence Region	-3.5835
Mar 1983	BELOW Local	Confidence Region	-9.3453
Apr 1983	BELOW Local	Confidence Region	-12.1155
May 1983	BELOW Local	Confidence Region	-14.3204
Jun 1983	BELOW Local	Confidence Region	-13.5147
Apr 1984	BELOW Overall	Confidence Region	-0.9782
Sep 1984	ABOVE Overall	Confidence Region	11.0334
Oct 1986	ABOVE Overall	Confidence Region	4.6265

## Bacterial Diseases

Nov 1984	ABOVE Overall	Confidence Region	0.5860
Dec 1984	ABOVE Overall	Confidence Region	3.0793
Jan 1985	ABOVE Overall	Confidence Region	2.6406
Feb 1985	ABOVE Overall	Confidence Region	4.2425
Mar 1985	ABOVE Overall	Confidence Region	3.9026
Apr 1985	ABOVE Overall	Confidence Region	2.8977
May 1985	ABOVE Overall	Confidence Region	1.2249
Jun 1985	ABOVE Overall	Confidence Region	1.2354

## Mycobacterial Diseases

Jan 1982	BELOW Overall	Confidence Region	-0.3454
Feb 1982	BELOW Overall	Confidence Region	-0.2691
Apr 1982	BELOW Overall	Confidence Region	-0.3269
Dec 1985	ABOVE Local	Confidence Region	0.7971
Jan 1986	ABOVE Local	Confidence Region	1.0772
Feb 1986	ABOVE Local	Confidence Region	1.5896
Mar 1986	ABOVE Local	Confidence Region	1.1977
Apr 1986	ABOVE Local	Confidence Region	0.8874
May 1986	ABOVE Local	Confidence Region	0.5043
Jun 1986	ABOVE Local	Confidence Region	0.3566
Jul 1986	ABOVE Local	Confidence Region	0.4329
Aug 1986	ABOVE Local	Confidence Region	0.3457
Sep 1986	ABOVE Local	Confidence Region	0.2437
Oct 1986	ABOVE Local	Confidence Region	0.0034

## Rickettsial Diseases

Cannot Analyze - only 22 Occurrences

Figure 50. Limits Text Report

TO VIEW GRAPHIC OUTPUT (Figure 51):

1. For graphics on major category:
  - 1a. Select major category according to instructions in section 1.7.
  - 1b. Click "GRAPHIC-MAJOR."
2. For graphics on minor category:
  - 2a. Select minor category according to instructions in section 1.7.
  - 2b. Click "GRAPHIC-MINOR."
3. To exit and return to EPISYS Desktop, click "DONE."

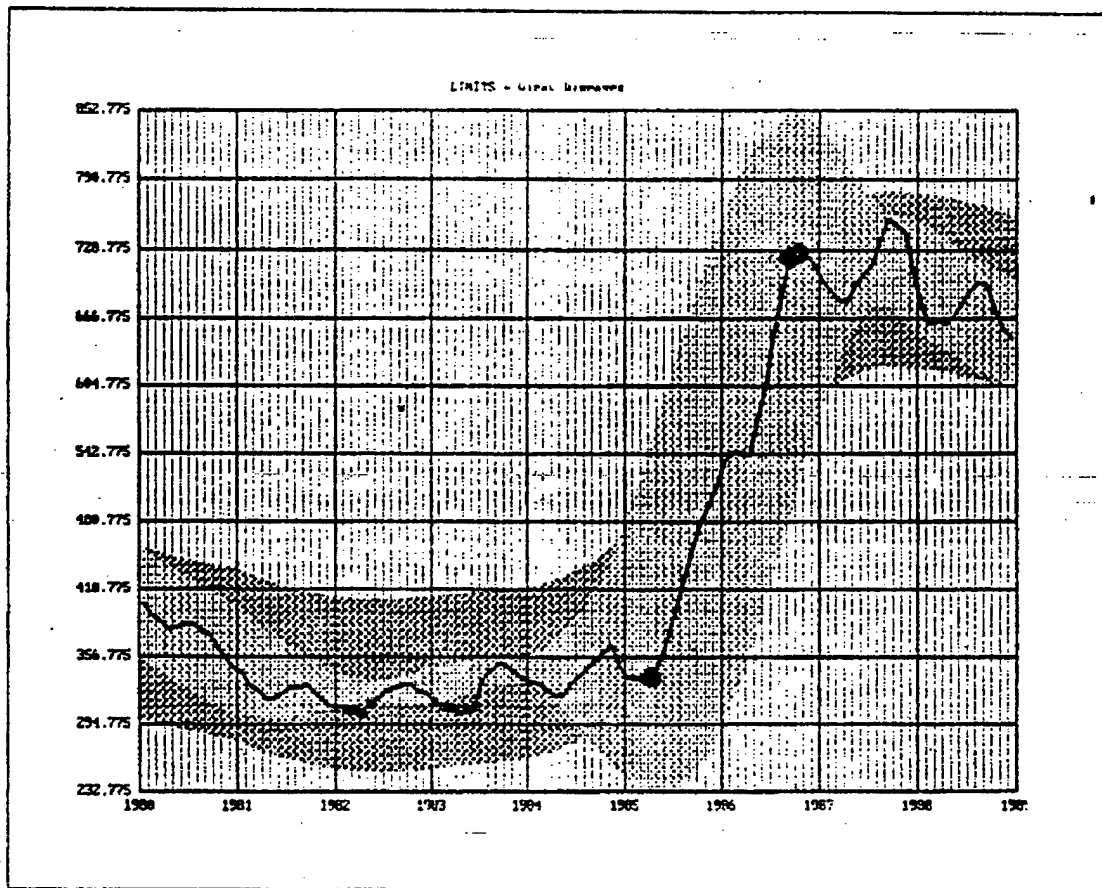


Figure 51. Limits Graphic Output.